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## ORIGINAL ARTICLE

## Clinical Case Studies: Novel Tools for Training Medical Students in Rational Prescribing Skills.

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### ABSTRACT

Inclusion of clinical case studies in pharmacology curriculum of Medical students is a novel way to inculcate rational prescribing skills in 'the future prescribing physicians'. The present prospective randomized cross-sectional study was conducted in the Postgraduate Department of Pharmacology and Therapeutics of a medical college as practical training of 98 fifth semester medical students to study prescribing practices in the teaching hospital and to make them aware of existing irrational practices. At the end of study 100% of students advocated conducting such exercises more frequently and 69.38% students said that rational prescribing is being practiced in our institution; however, 81.63% of students still advocated to improve rational prescribing in institute. 100% students suggested to give exposures of clinical case studies to undergraduate students, 61.22% proposed to conduct periodic seminars and CME (continue medical education) programs on rational prescribing, 40.81% suggested to conduct classes regarding rational prescribing of postgraduate students from different departments of the institute and 93.81% recommended to encourage frequent interactions between pharmacologists and practitioners to improve rational prescribing program. The present study could serve as a model for training students in various aspects of pharmacology with an aim to produce rational prescribers instead of confused practitioners.

**Key Words:** Rational prescribing, training medical students, clinical case studies

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### Introduction

Drug prescriptions form an important point of contact between health care providers and patients. Rational prescribing of drugs requires that patients receive medication appropriate to their clinical needs in right dose for an adequate period of time and at the lowest cost to them and their community. Bad prescribing habits

lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to patient and higher costs. Physician-industry interactions appears to affect prescribing and professional behavior of doctors, which may result into irrational prescribing in-terms of inability to identify wrong claims about medication, positive attitude toward pharmaceutical representatives, increasing prescription rate, prescribing fewer generic but more expensive, newer medications at no demonstrated advantage[1],[2]. Later on, new graduates copy them and the vicious circle goes on. It is not only difficult to change existing prescribing habits; but also requires lot of money and time. So good training needs to be provided, before poor habits can get a chance to develop. Keeping this in view a practical exercise on analysis of clinical cases

regarding rational prescribing is introduced in pharmacology curriculum of Medical students.

Hence, the present prospective randomized cross-sectional study was conducted in the Postgraduate Department of Pharmacology and Therapeutics of a medical college as practical training of fifth semester medical students to study prescribing practices in the teaching hospital and to make them aware of existing irrational practices. Before starting the study, ninety eight students of fifth semester were trained in rational prescribing by using audio-visual aids and giving therapeutic exercises [Annexure 1] regarding P-drug and P-treatment concept [3]. Students were divided into twenty groups; each group was composed of five students except the last group (three students). Two groups were allotted to each teacher (senior or junior residents) and written proformas were distributed to students [Annexure 2]. Each student had to fill five proformas after examining the case sheets of indoor patients (after taking patient's consent), in Medicine department of the institution. No overlapping of patients was allowed and study was carried over a span of three months. At the end of study all proformas were collected and analysed for various WHO parameters of rational drug prescribing in order to make students aware of existing rational/irrational practices and to have a feedback from them regarding ways to improve existing prescribing practices. Out of total 490 Proformas only 442 were analysed and rest were discarded because of either being incomplete or were wrongly filled. Moreover, students had to appear for viva-voce of their cases before the respective teachers to assess their understanding regarding rational and irrational prescribing practices [Annexure 3]. Any drug prescribed in wrong dose or wrong dosage form or for wrong duration or for wrong indications or for wrong patient or an irrational combination was considered as irrationally prescribed.

**Anexure1: Examples Of Therapeutic Exercises Given To The Students :**

<p><b>Exercise-1</b></p> <p>A pregnant lady is having Syphilis and she is hypersensitive to penicillin. What is your P-treatment for the lady.</p>
<p><b>Exercise-2</b></p> <p>A pregnant lady comes to you with high grade fever for five days. Her blood pressure is 110/70 mmof Hg and widal test positive for Salmonella typhi. What is your P-treatment for the patient.</p>
<p><b>Exercise-3</b></p> <p>Kuljeet 45 years old having history of diabetes mellitus for the past 10 years presents to you with headache and giddiness for 3 days. He is on tab metformin 500mg daily. On examination his blood pressure is 160/98mm of Hg. What is your diagnosis and P-treatment for the patient.</p>

**Anexure-2:**

Name	Age	Sex	Weight		
MRD NO					
Provisional Diagnosis					
Positive clinical and laboratory findings:					
Final Diagnosis:					
Non-Pharmacological treatment:					
Pharmacological Treatment:					
S.no	Drug	Dose	Dosage form	Route	Duration w.e.f to
Number of drugs prescribed by generic name:					
Number of drugs from essential drug list:					
Number of drugs in fixed dose combinations:					
Comment upon the quality of Prescription:					
Rationally analyse the drugs prescribed:					

**Anexure-3: Questionnaire For Viva-Voce Of The Students Regarding Their Cases.**

1. What is the diagnosis of the given case?
2. What are the treatment options for the given diagnosis?
3. Does the prescription fulfill the criteria for rational prescribing?
4. Comment upon the quality of prescription writing?
5. What are the short comings in the prescription and how can you improve it?
6. How many drugs are prescribed by the generic name?
7. How many drugs are prescribed from the essential drug list of the institute?
8. What are the advantages of prescribing a drug by generic name?
9. Give the justification for prescribing the following drugs to this patient?
10. Do you think drugs are prescribed in the correct dose and dosage form?
11. Does the P-treatment of the given prescriber match your P-treatment/P-drug for the given patient?
12. If no, then what is your P-treatment/P-drug for the given patient and why?
13. Do you think prescriber is following the rational prescribing practices?
14. How can we further improve rational prescribing practices in our institute?

Total 1744 drugs were prescribed in prescriptions with an average of 3.94 drugs per prescription [Table/Fig 1]. Topical, injectables and oral preparations constituted 6.88%, 16.86% and 76.26% of drugs respectively. Average drug prescribing of 3.94/ prescription in this study is more than that reported from outpatient prescriptions study of the same institute and from other hospitals of the country [4], [5], [6], [7]. Although poly-pharmacy is in itself associated with risk of drug interaction and adverse drug reactions along with added cost; multiple drugs prescribed per prescription in the present study could be because of patients with serious conditions or complex pathology. Prescribing under generic name is considered rational and economic, but only 24.77% generic drugs were prescribed in this study, which is less than that reported earlier (74.38%) from a tertiary care hospital of India [7]. The Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002 states that every physician should, as far as possible,

prescribe drugs with generic names and he/ she shall ensure that there is a rational prescription and use of drugs [8]. It also goes on to state that it is not unethical for a physician to prescribe drugs as long as there is no exploitation of patient and this should explicitly state the proprietary as well as generic name of drug[8]. Hence, there is need to encourage prescribers to prescribe more by generics either by enforcing laws or by discouraging entertainment of medical representatives in the hospital premises.

(Table/Fig 1) Prescribing Practices In Indoor Departments Of A Teaching Institute.

Parameters	Number	Percentage
Total drugs prescribed	1744	
*Topical	120	6.88%
*Injectables	294	16.86%
*Orals	1330	76.26%
*Fixed-Dose Combinations	46	2.637%
Average number of drugs / prescription	3.94	
Drugs by generic	432	24.77%
Prescriptions with Abbreviations	346	78.28%
Dose mentioned	324	73.30%
Dosage form mentioned	372	84.16%
Route of drug mentioned	358	80.99%
Duration of therapy mentioned	140	31.67%
Instruction to the patient in writing mentioned	68	15.38%
Number of drugs from Essential Drug List	1652	94.72%

Abbreviations, dose, dosage form, route and duration of therapy were found in 78.28%, 73.30%, 84.16%, 80.99% and 31.67% of the prescriptions respectively. However, proper written instructions to patients were mentioned in only 15.38% of prescriptions. Antibiotics were the most commonly prescribed drugs followed by NSAIDs (nonsteroidal anti-inflammatory drugs), antihypertensive drugs, PPIs (proton pump inhibitors)/H2-blockers and others [Table/Fig 2].

(Table/ Fig 2) Pattern Of Drug Use In 442 Prescriptions (1744 Drugs) Of Indoor Patients The Teaching Institute.

Drug Groups	Number	Percentage	Rationally prescribed n(%)
Antimicrobials	340	19.49%	288(84.70%)
NSAIDs	236	13.53%	226(95.76%)
Anti-hypertensive	192	11%	170(88.54%)
PPI/H2 blockers	142	8.14%	102(71.83%)
Bronchodilators	104	5.96%	104(100%)
Diuretics	90	5.16%	90(100%)
Vitamins/iron/calcium/Nutritional supplements	88	5.04%	42(47.73%)
Antiprotozoals	78	4.47%	78(100%)
ATT	68	3.89%	68(100%)
Antiglaucoma	64	3.67%	64(100%)
Hypolipidemics	59	3.38%	59(100%)
Antianginal	58	3.32%	58(100%)
Sedatives	34	1.94%	34(100%)
Anti-allergics	33	1.89%	33(100%)
Steroids	26	1.49%	58(100%)
Hypoglycemics	24	1.37%	24(100%)
Anti-epileptics	18	1.03%	18(100%)
Others	190	5.16%	165(86.68%)

N=number, NSAIDs= non-steroidal anti-inflammatory drugs, PPIs= proton pump inhibitors, ATT= antitubercular drugs.

Cephalosporins, penicillins, quinolones, aminoglycosides and macrolides constituted 31.76%, 25.29%, 20.58%, 18.82% and 3.53% of antibiotics prescribed respectively. Among antibiotics, cephalosporins were the most frequently prescribed drugs as reported earlier [9]. Among NSAIDs, diclofenac sodium and paracetamol constituted 47.45% and 38.13% of NSAIDs prescribed respectively. Earlier studies have reported higher rate of prescription of Cox-2(cyclo-oxygenase) selective drugs than NSAIDs [6]. However, in the present scenario of controversy (recent evidences of cardiovascular and renal complications) with Cox-2 inhibitors, prescribers of this institution were rational in preferentially prescribing diclofenac (NSAIDs) [10]. Calcium channel blockers (CCBs), beta-blockers, angiotensin converting enzyme inhibitors / angiotensin receptor blockers, alpha-Methyl DOPA and others constituted 27.08%, 21.87%, 27.08%, 8.33% and 15.62% of antihypertensive drugs prescribed respectively.

Vitamins/Iron/Calcium/Nutritional supplements were the most irrationally prescribed drugs; where as 84.70% of antibiotics were prescribed rationally and rest included irrational combinations like ampicillin-cloxacillin, ampicillin-cephalosporin combination etc [Table/Fig 2]. 71.83% of PPIs/H2-blockers,

88.54% of antihypertensives, 88.46% of antiprotozoals, 95.76% of NSAIDs were rationally prescribed [Table/Fig 2]. This indicates that in this institution most of the drugs are rationally prescribed than earlier reports of only 60% of antimicrobials being rationally prescribed in teaching institutes [9]. However, in the present study rationality of drug prescribed in relation to the P-drug / P-treatment concept was analysed considering ideal prescribing conditions and confounding factors like resistance pattern, prescriber's personal choice, financial constrains etc were not taken into account, which could be considered as a lacuna of the study.

WHO -Indian Program on rational use of drugs aims at promoting rational drug prescribing through various interventions to correct drug use problems, adoption of essential drug list, development of standard treatment guidelines, determining and restricting irrational drug prescribing[4]. In the present study 94.72% of the drugs were prescribed from institutional essential drug list, which is similar to that reported earlier from a tertiary care hospital[7]. The need for promoting appropriate use of drugs in health care system is not only because of the financial reasons with which policy makers and manager are usually most concerned, but also for health and medical cares of patients and the community. At the end of the study when students were asked regarding their suggestions, 100%(98) of the students advocated to conduct such exercises more frequently and 69.38%(68) student said that rational prescribing is being practiced in our institution; however, 81.63%(80) students still advocated to improve the rational prescribing in the institute. 100%(98) students suggested to give exposures of clinical case studies to the undergraduate students, 61.22%(60) proposed to conduct periodic seminars and CME (continue medical education) programs on rational prescribing, 40.81%(40) suggested to conduct classes regarding rational prescribing of postgraduate students from different departments of the institute and 93.81%(92) recommended to encourage frequent interactions between pharmacologists and practitioners.

## Summary

Inclusion of clinical case studies in pharmacology curriculum of Medical students is a novel way to inculcate rational prescribing skills in the future prescribing physicians. In the present scenario when the academicians and researchers are much worried about development of new molecules and technologies to target various pathologies at molecular level, it is really vital to emphasize on rational drug therapy in order to pass the benefits of new researches to the consumers (patients). Student's participation studies are not only important in rational prescribing, but also in other field like pharmaco- vigilance, pharmaco-economics, community pharmacology, etc. Hence, the present study could serve as a model for training students in various aspects of pharmacology with the aim to produce rational prescribers instead of confused practitioners.

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