

Assessment of Improvement in Prescribing Skills of 2nd Phase MBBS Students after Administering an Educational Intervention on Safe Prescribing Based on WHO Guidelines: A Quasi-experimental Study in a Teaching Hospital of Odisha

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Abstract

National Medical Council has included teaching rational prescribing practices into its 2nd phase medical curriculum to inculcate the habit of writing rational and legible prescription by the health-care professionals to reduce prescription errors. The study aims to assess the improvement in prescribing skill of 2nd phase MBBS students by comparing against the WHO guidelines for prescription writing after teaching them the concepts of rational prescription writing, p-drug and how to effectively communicate with patients on proper use of prescribed medications. Also assess the confidence of the students in basic prescribing skill and better retention of pharmacology concepts by a feedback questionnaire before and after the teaching session. 238 students of 2nd phase MBBS were asked to write a prescription for a common clinical condition and answer a self-administered questionnaire. An educational intervention session was conducted in small groups of 25 students. They were allowed 1 day for self-study and again the same process was repeated. Their prescriptions (both pre-session and post-session) were analysed based on WHO guidelines of safe prescribing and the feed-back questionnaire were analysed using appropriate statistics. In the 4-point scoring system there is an improvement in the post-session scores for prescriber details (53% having score1), patient details (50% having score3) and as for drug details 36% students scored 1 and 39% scored 3 as they forgot to address the problem of drug-drug interaction. Teaching concept of prescription writing to undergraduate students in small groups greatly influences the quality of prescriptions of the students and helps build more confident prescribers and less prescription errors.

Keywords: Educational Intervention, Prescription Error, Prescription Writing, 2nd Phase MBBS Students.

Introduction

Prescribing skills are integral to the practice of medicine, playing a vital role in patient care, safety, treatment outcomes, and collaborative healthcare. Physicians need to have a comprehensive understanding of pharmacology and therapeutics to make informed decisions about the most appropriate medications for their patients. Prescribing skills include the ability to educate patients about their medications, ensuring they understand the importance of compliance, potential side effects, and any necessary lifestyle modifications. Deficiency in medical education have led to poor application of theory knowledge in practice while writing a proper prescription that has caused increase in prescribing errors (1). Errors in writing a rational Prescription comprise 70% of medication error

resulting in adverse effects (2). Prescribing errors can have serious consequences for patients and is a frequent cause of morbidity and mortality that is preventable (3). Several studies linking adverse effects to prescribing errors have been conducted (4-6). Prescribing practices among health care professionals can face various challenges like inadequate knowledge about rational prescribing practices, pharmaceutical company influence, lack of patient education or communication gaps maybe due to heavy workloads. Addressing these issues is crucial to ensure that future healthcare professionals develop the necessary skills for safe and effective prescribing. Keeping this need in mind, the World Health Organization had published the guide to good prescribing in 1994 which is a 6-step model for rational prescribing

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that was intended for undergraduate students and their teachers. Though several research works have referred to it since its publication, it has not been effectively utilized in teaching undergraduates. As such, with the introduction of Competency Based Undergraduate Curriculum in 2019 the National Medical Council has included teaching rational prescribing practices into its 2nd phase medical curriculum with an emphasis on developing and refining these skills to ensure competent and responsible healthcare professionals (7). Medical education emphasizes the importance of prescribing skills to ensure that healthcare professionals can prescribe medications safely, minimizing the risk of adverse effects, interactions, or other potential harm. Medical education also includes training on the communication, ethical, and legal aspects of prescribing. With this background the present study is conducted to assess how effective is teaching good prescription writing to 2nd phase MBBS students in reducing medication errors? The present study aims to assess the improvement in prescribing skill of 2nd phase MBBS students by comparing against the WHO indicators for good prescription after teaching them the concepts of rational prescription writing, p-drug and communication to the patients on proper use of prescribed medications.

Methodology

A small number of studies have been done for assessing prescribing skills of MBBS students in India, while there are no studies for assessing the efficacy of medical education in improving the prescribing skills of MBBS students in a tertiary care centre in Odisha. During the study, all the enrolled participants were approved with a written consent form and ethical approval was obtained with Letter No: Ref. no/IEC/IMS.SH/SOA/2024/754. The present study aims to assess the efficacy of teaching good prescribing practices as outlined by WHO to the students and its effect on improvement in their prescribing skills (8). The study also helps to assess the improvement in the confidence of the students in basic prescribing skills and better retention of pharmacology concepts by means of a self-administered semi-structured feedback questionnaire. A quasi-experimental study design was planned to study the effect of using an

educational intervention in improving the prescribing skills of 2nd phase MBBS).

Sampling

A Purposive sampling method was used to include all students of 2nd phase MBBS from IMS & SUM hospital who had given written consent. Purposive sampling technique is a type of non-random sampling method which is used for qualitative data. We have used a homogenous purposive sampling where the participants are chosen based on their common demographic profile and level of knowledge. So, all the students of 2nd phase MBBS who had already been taught the basic pharmacology concepts and drugs for different conditions were included in the study. A total of 250 students gave consent to participate in the study, but 238 students completed the post-session. 12 students could not attend the post-session due to various reasons.

Study Setting and Time

The study was carried out in the lecture theatre of Department of Pharmacology. The study was completed in a total of 1 month period including the time required for validation of the feedback questionnaire and small group teaching sessions.

Study Method

The feedback questionnaire was standardized initially by pretesting it on a group of 30 students. The questions were modified and retested after assessing the feasibility of the questions. All the participants were provided with a participant ID. A small group of 25 students each were identified. They were asked to write a prescription for a common clinical condition and answer a self-administered semi-structured questionnaire to assess the confidence of students in basic prescribing skills and understanding concepts of clinical pharmacology (Table 1). Then a 2-hour educational intervention session on a general introduction to prescription writing, selecting the preferred drugs, using the drug formulary and communication to patient on proper use of drug based on WHO guidelines for good prescribing was conducted. The participants were allowed 1 day for self-study where they were given 5 clinical cases as exercise at home and again the same process was repeated post-session. The study was conducted on the small groups separately on consecutive days by the faculties of pharmacology department using a common study material.

Table 1: Feed-back Questionnaire

ID of the participant: _____	Date: _____
Feedback questionnaire: (semi-structured self-administered)	
1. Have you ever had any previous exposure to prescription writing? a. Yes b. No 2. Do you feel prescription writing should be included in the undergraduate curriculum? a. Yes b. No 3. Are you aware about the WHO guidelines for good prescribing? a. Yes b. No 4. What is P-drug? a. Preferred drug of the physician b. Drug personalized for the patient 5. Which name do you prefer while writing drugs? a. Brand name b. Generic name 6. Is there a difference in writing a prescription in pediatric patient? a. Yes b. No	
Mention the difference: _____	
7. Do you know the 5-R framework for prescription communication to the patient? a. Yes b. No	
Mention the 5-R: _____	
8. Do you feel confident in writing a rational prescription for any common medical condition in proper format? a. Yes b. No 9. Do you feel inclusion of prescribing skills in UG curriculum helps in better retention of pharmacology concepts? a. Yes b. No	
Mention some concepts of pharmacology that can be better understood by learning prescription writing: _____	

The assessor is a faculty from the department of Pharmacology who is well trained in all the above concepts and how to use the scoring system but is not aware about the nature of the research. The prescriptions were analysed according to the following parameters based on WHO guidelines of rational prescribing (Table 2) (8). The completeness of the prescription and the overall legibility was assessed on a 4-point rating system (9, 10).

- Score 1: complete, clear & legible

- Score 2: complete, clear & legible but require effort to read
- Score 3: criteria not met for one aspect
- Score 4: more than one aspect not clear

Statistical Analysis

The prescriptions (both pre-session and post-session) were analysed based on WHO guidelines of safe prescribing and the feedback questionnaire were analysed for both the pre and post-sessions. The data was entered into an Excel sheet and statistically analysed. Results were presented as frequency and percentage.

Table 2: Checklist for Prescription Parameter Analysis

Checklist Items	Pre-Session		Post-Session	
	Yes	No	Yes	No
ID of the participant: _____ Date: _____				
Prescription parameters to be analyzed:				
A. Completeness of the prescription:				
1. Prescriber related components				
a. Name of prescriber				
b. Qualification				
c. Registration number				
d. Date of prescription				
e. Address of prescriber				
f. Phone number; mail id				
2. Patient details				
a. Name, age, sex, height, weight, date of birth in neonates & infants and address of patient and phone number.				
b. Allergy history				
c. Chief complains or brief history & physical examination				
d. Diagnosis				
3. Drug details				
a. Symbol " Rx"				
b. Primary drug first				
c. Number of drugs				
d. Complete dosing regimen of each drug – dosage form, route of administration, individual dose, frequency of dosing and duration of use, relation with food.				
e. Drug-drug interaction				
f. Drug regimen according to STG				
g. Generic name				
h. Capital letters				
i. Use of abbreviations				
j. Dispensing directions to pharmacist				
k. Advice to patient on proper use of drug/device				
l. Follow-up advise/ revisit instructions				
m. Investigations advised				
n. Signature of the prescriber				
B. Overall legibility				

Results

The pre-session and post-session prescriptions of a total of 238 MBBS students were analysed for completeness and overall legibility. The results of the analysis are shown in the table below (Table 3). There is an overall improvement in writing the prescriber details with marked increase in

percentage students mentioning the registration numbers (0% to 70%), address (24% to 79%) and phone number (16% to 64%). 100% students mentioned the prescribers name and qualification post-session. There was a definite improvement in writing the complete patient details (13% to 50%) with students forgetting to write the phone

number of patients. The students took care to mention the chief complains and diagnosis after the educational session (20% to 75%). But there was a lacking in writing the allergy history of the patients. After the educational session the

students showed improvement in writing the complete drug regimen (11% to 66%) the generic name of drug (70% to 90%) in capital letters (10% to 73%). Overall legibility of the prescription improved from 36% to 83%.

Table 3: Analysis of Prescription Parameters

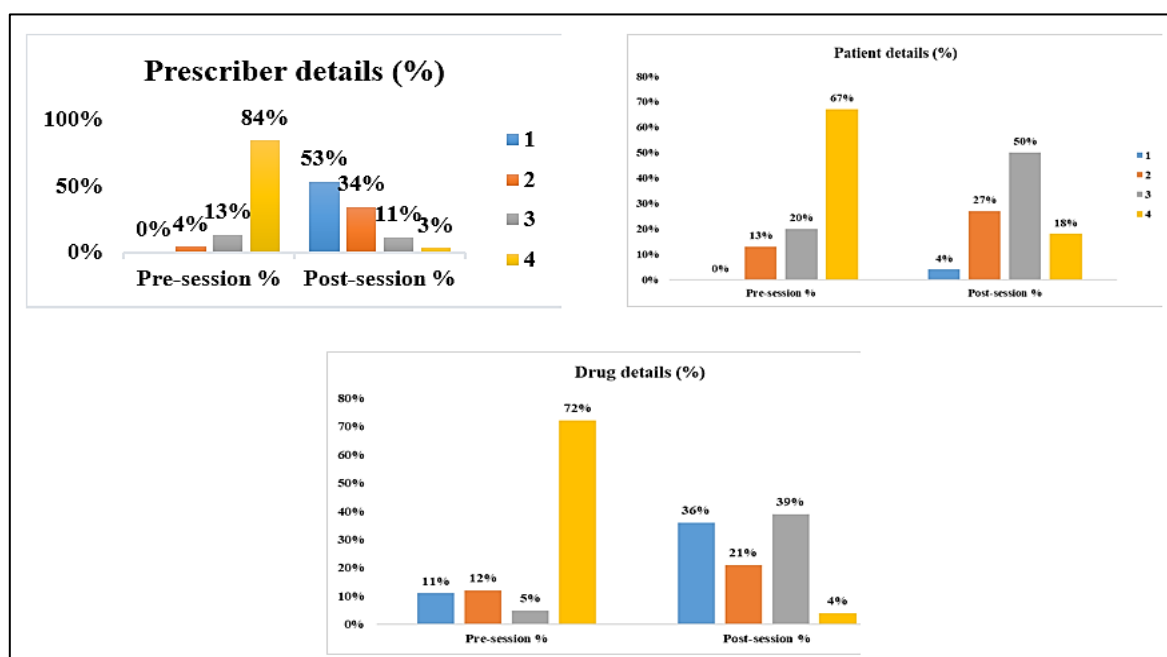
Prescription parameters to be analyzed:		Pre-Session	Post-Session
1. Completeness of the prescription:		Mentioned, N (%)	Mentioned N (%)
Prescriber related components	Name of prescriber	156 (66)	238 (100)
	Qualification	82 (35)	238 (100)
	Registration number	0 (0)	167 (70)
	Date of prescription	118 (50)	200 (84)
	Address of prescriber	56 (24)	188 (79)
	Phone number; mail id	39 (16)	153 (64)
Patient details	Name, age, sex, height, weight, date of birth in neonates & infants and address of patient, phone number.	31 (13)	120 (50)
	Allergy history	0 (0)	5 (2)
	Chief complains or brief history & physical examination	0 (0)	143 (60)
	Diagnosis	48 (20)	178 (75)
Drug details	Symbol " Rx"	81 (34)	228 (96)
	Primary drug first	16 (7)	98 (41)
	Capital letters	24 (10)	174 (73)
	Complete dosing regimen of each drug – dosage form, route of administration, individual dose, frequency of dosing and duration of use, relation with food.	26 (11)	158 (66)
	Drug regimen according to STG	26 (11)	156 (66)
	Generic name	166 (70)	214 (90)
	Use of proper abbreviations	69 (29)	116 (49)
	Address to drug-drug interaction	2 (0.8)	96 (40)
	Dispensing directions to pharmacist	0 (0)	47 (20)
	Advice to patient on proper use of drug/device	19 (8)	115 (48)
	Follow-up advise/ revisit instructions	4 (2)	125 (53)
	Investigations advised	0 (0)	54 (23)
	Signature of the prescriber	64 (27)	216 (91)
	2. Overall legibility (legible)	86 (36)	197 (83)

On evaluating the prescriptions on a 4-point scoring system it was observed that there was an improvement in the post-session scores (53% having score 1) compared to pre-session (84% having score 4) in writing prescriber details (Table 4, Figure 1). Improvement in writing patient details was also improved in the post-session (50% having score 3) compared to pre-

session (67% having score 4), but scores were not much improved as students still forgot to write the allergy history, which is an essential part of prescription writing. As for writing drug details, 36% of students scored 1, and 39% scored 3 as they forgot to address the problem of drug-drug interaction. But there was definite improvement compared to pre-session (72% scored 4).

Table 4: 4-point Scoring System for Completeness of Prescription and Overall Legibility

Completeness of prescription & overall legibility	Scores	Pre-Session scores N (%)	Post-Session scores N (%)
Prescriber details	1: complete, clear & legible	0 (0)	126 (53)
	2: complete, clear & legible but require effort to read	9 (4)	80 (34)
	3: criteria not met for one aspect	30 (13)	26 (11)
	4: more than one aspect not clear	199 (84)	6 (3)
Patient details	1: complete, clear & legible	0 (0)	10 (4)
	2: complete, clear & legible but require effort to read	31 (13)	65 (27)
	3: criteria not met for one aspect	48 (20)	120 (50)
	4: more than one aspect not clear	159 (67)	43 (18)
Drug details	1: complete, clear & legible	26 (11)	86 (36)
	2: complete, clear & legible but require effort to read	28 (12)	49 (21)
	3: criteria not met for one aspect	12 (5)	94 (39)
	4: more than one aspect not clear	172 (72)	9 (4)

**Figure 1:** 4-point Scoring System for Completeness of Prescription and Overall Legibility

After analysing the feedback questionnaire (Table 5), it was found that 82% of the students did not have any previous exposure to prescription writing, and 46% felt that it should be included in undergraduate curriculum. But after the session 87% felt it should be included in the curriculum. The students were not aware about the WHO guidelines for good prescribing (57%) or the concept of P drug (92%). Though the students had knowledge about drug nomenclature but only 24% preferred writing the generic name in prescriptions before the session which improved

to 84% post-session. The students felt more confident in writing a rational prescription in proper format (94%) and to communicate with the patients (76%) after the session. The Majority of students feel that the inclusion of prescribing skills in UG curriculum helps in better retention of pharmacology concepts (52% pre-session, 92% post-session). They also feel that there should be reinforcing classes during 3rd phase and during the internship period (74% pre-session, 95% post-session).

Table 5: Analysis of Feed-back Questionnaire

Question	Pre-Session N (%)			Post-Session N (%)		
	Yes	No	NA	Yes	No	NA
1. Have you ever had any previous exposure to prescription writing?	16 (7)	196 (82)	26 (11)	238 (100)	0 (0)	0 (0)
2. Do you feel prescription writing should be included in the undergraduate curriculum?	110 (46)	13 (5)	115 (48)	206 (87)	4 (2)	28 (12)
3. Are you aware about the WHO guidelines for good prescribing?	9 (4)	136 (57)	93 (39)	238 (100)	0 (0)	0 (0)
4. What is P-drug?	10 (4)	218 (92)	10 (4)	211 (89)	16 (7)	11 (5)
5. Which name do you prefer while writing drugs? Generic	56 (24)	62 (26)	120 (50)	199 (84)	25 (11)	14 (6)
6. Is there a difference in writing a prescription in pediatric patient?	78 (33)	12 (5)	148 (62)	174 (73)	8 (3)	56 (24)
7. Do you know the 5-R framework for prescription communication to the patient?	0 (0)	116 (49)	122 (51)	182 (76)	11 (5)	45 (19)
8. Do you feel confident in writing a rational prescription for any common medical condition in proper format?	17 (7)	96 (40)	125 (53)	224 (94)	12 (5)	2 (1)
9. Do you feel inclusion of prescribing skills in UG curriculum helps in better retention of pharmacology concepts?	123 (52)	21 (9)	94 (40)	219 (92)	5 (2)	14 (6)
10. Should there be reinforcing classes during 3rd phase and during internship period?	176 (74)	14 (6)	48 (20)	226 (95)	8 (3)	4 (2)

Discussion

The knowledge about the WHO guide to good prescribing helps the prescriber to inculcate the habit of writing rational and legible prescription. Thus, this needs to be implemented in the undergraduate curriculum to sensitize the students about the importance of a rational and legible prescription. This can help reduce medication errors due to poor-quality prescription. Our study results help to assess the improvement in the quality of prescriptions of 2nd phase MBBS students by comparing against the WHO guidelines for prescription writing after teaching them the concepts of rational prescription writing, p-drug and how to effectively communicate with patients on proper use of prescribed medications. Before the session on rational prescribing, the students were not aware about all the components of prescriber, patient or drug details. Most common type of error was lack of information about registration number, address or phone number of prescriber, patient address, phone number, chief complaints or diagnosis, most of the drug details. This was found consistent with a study conducted on pre-clinical MBBS students in Nepal (11). After the session

there was a definite improvement in prescribing skills of the students, but the score was still poor regarding drug details. Improvement in prescribing skills after an educational intervention was consistent with a systematic review report published in 2023 (12). The students had difficulty choosing the primary drug, addressing drug-drug interaction, dispensing instruction to pharmacist. Previous studies have also shown lack of knowledge about complete drug schedule among dental students (13). The 4-point scoring system showed improvement in prescriber details and patient details post-session, but the improvement in drug details was less marked. This shows there is weak knowledge about the dosing pattern of drugs, which is also seen in other studies (14, 15). From the feedback questionnaire it was analysed that the students were not aware about the basic principles of prescription writing or communicating with patients. After the session, they felt more confident in writing prescriptions in a proper format. The students felt that the teaching of prescribing skills should be an essential part of Pharmacology curriculum as it also helps better retain the pharmacotherapeutics concept as well

as drug interaction, but the knowledge should also be reinforced during their clinical and internship years. They better understood the concept of patient communication after the session.

Conclusion

The present study concludes that introducing concept of prescription writing to undergraduate curriculum greatly influences the quality of prescriptions of the students and helps build more confident prescribers. This may go a long way in reducing medication errors due to wrong prescriptions. Also, the introduction of rational prescription writing helps the students to better understand and retain the concepts of clinical pharmacology and therapeutics.

Abbreviations

Nil.

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Author Contributions

All the authors contributed equally.

Conflict of Interest

The authors declare there is no conflict of interest among them.

Ethics Approval

Ethical approval was obtained with Letter No: Ref. no/IEC/IMS.SH/SOA/2024/754. A written consent was approved from every student who was enrolled in the study.

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