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RESEARCH ARTICLE

Evaluation of hands on training on prescription writing skills among medical students in a tertiary care teaching hospital

Geetha Raghu[1], Balaji Arumugam[2], Preetha Paul[3]

[1]Department of Pharmacology, Tagore Medical College and Hospital, The Tamil Nadu Dr. M.G.R Medical University, Chennai, Tamil Nadu, India, [2]Department of Community Medicine, Tagore Medical College and Hospital, The Tamil Nadu Dr. M.G.R Medical University, Chennai, Tamil Nadu, India, [3]Department of Physiology, Tagore Medical College and Hospital, The Tamil Nadu Dr. M.G.R Medical University, Chennai, Tamil Nadu, India

Correspondence to: Geetha Raghu, E-mail: dr.geetharaghu@gmail.com

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ABSTRACT

Background: Prescription writing is an essential and a basic skill to be acquired by medical students during their training. Specific training and supervision in writing a rational prescription should be emphasized during undergraduate teaching to minimize prescription errors. **Aims and Objectives:** The prime objective of this study was to evaluate the ability of the second-year MBBS students to write a prescription and to assess the effectiveness of hands on training on appropriate prescription writing. **Materials and Methods:** A cross-sectional, observational study was conducted among 117 second-year MBBS students. Students were asked to write prescriptions for three case scenarios. An educational interventional session and hands on training was conducted. Post session the students were asked to write prescriptions for three different case scenarios. All the prescriptions were analyzed and feedback was given to the students. **Results**: 350 prescriptions each were collected pre- and post-educational interventional sessions from the students. The completeness of the prescriptions were analyzed on the basis of the prescriber and drug-related components. A widespread lacunae was observed in the prescription writing skills of the medical students, which improved significantly ($P < 0.05$) after the educational interventional sessions and hands on training. **Conclusion:** This study shows that hands on training has improved the prescription writing skills of the medical students. This type of training should be included as a part of pharmacology practical curriculum.

KEY WORDS: Prescription Writing; Prescribing Errors; Educational Interventional; Hands On

INTRODUCTION

Prescription writing is an essential and a basic skill to be acquired by a medical student during their undergraduate training. A prescription is a written order from the prescriber, which gives a detailed instruction about the medicine to be given for a patient.[1]

Prescribing drugs is a complex and highly essential intervention, which needs to be based on accurate information with critical thinking, this will be useful in writing a rational and safe prescriptions.[2] Prescriptions are legal documents, so it is essential that they include complete information of the patient and the prescribing doctor.

The need to prescribe appropriate drugs in correct doses is very important, as it may influence the patients health, if not done judiciously, thus specific training and guidance is

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needed during undergraduate teaching, to avoid prescription-related errors.[3]

Pharmacology is a vital component of the medical curriculum where the medical students are taught the art of rational prescribing of drugs.[4] Pharmacology teaching enhances the knowledge and skill of medical students about the different drug formulations and their usefulness in the treatment of various diseases.[5]

Even though the art of writing prescriptions is learnt during their second year, the de - learning starts once they enter their third-year clinics, this may be due to increased work load, casual attitude, and no fear of assessment. The reason for this callous attitude needs to be deciphered.[6]

Deficiency in prescribing during undergraduate education has been linked to the increased occurrence of medication errors, specifically by the interns,[7] which can result in serious health risks and unnecessary economic burden on the patient.[8] 70% of the medication errors are due to prescription-related errors, which have resulted in morbidity and mortality.[9,10]

In the studies done to evaluate the prescription writing skills of the interns and junior doctors,[11-14] improper training of the students in clinical pharmacology at the undergraduate level was found to be the most important reason responsible for the weak skills of the prescriber.[15-17] Therefore, it is essential to have a proper education-based intervention during their undergraduate training to improve the prescribing competencies of the young doctors before any major adverse event happens.

Objectives

The prime objective of this study was to evaluate the ability of the second-year MBBS students to write a prescription and to assess the effectiveness of hands on training on appropriate prescription writing.

MATERIALS AND METHODS

A cross-sectional, observational study was carried out at Tagore Medical College and Hospital, Chennai, among the second-year MBBS students.

Second-year MBBS students who were willing to participate were included in the study. Approval from the Institutional Ethics Committee and informed consent from the students were obtained before the study was conducted. Students were asked to write prescriptions for three different case scenarios. After collecting the prescriptions, sessions on rational prescribing and the need and importance of the various components of the prescription were conducted.

Students were then divided into groups, discussion on prescriptions written by them was conducted by the facilitators of each group. The errors in their prescription writing were pointed out to them. Prescriptions with errors set within the clinical scenarios were given to each group and they were asked to audit and rewrite them. Sample prescriptions with illegible handwritings and common prescribing errors were shown to them and the harmful consequences which arise due to such errors were explained in detail. The students were then asked to write prescriptions for three different case scenarios as hands on experience. The prescriptions were scrutinized and feedback was given to the students to improve their prescribing knowledge for future application.

The prescribing knowledge of the students were assessed based on the prescriptions quality, written in compliance with good prescribing pattern and the World Health Organization (WHO) core prescribing indicators. The completeness of each prescription was assessed on the basis of two main components.[1]

1. Prescriber-related components:
   A. Prescriber information: Name of the prescriber, qualification, registration number, prescriber signature, date of the prescription, symbol Rx ("take thou"), and diagnosis.
   B. Patient information: Patient name, age, gender, and address.
2. Drug-related components: Appropriateness of the selected drug, strength of the drug, dose of drug, dose unit, dosage form, frequency, duration, route of administration, and directions for use.
3. Other components analyzed: Legible handwriting, Information in capital letters.

Statistical Analysis

The data obtained were analyzed using the Statistical Package for the Social Sciences software version 20. McNemar's and Chi-square test were done to find out the significant difference in the percentage of errors before and after the educational interventional sessions. Significance level was set at 95%.

RESULTS

117 second-year MBBS students participated in this study. A total of 350 prescriptions were collected before the interventional sessions and 350 prescriptions after the interventional sessions.

Analysis of prescriber information was done, it was found that the prescriber name, qualification, registration number, and signature was missing in 55%, 63%, 58%, and 56% of the prescriptions, respectively (Figure 1). After the educational intervention, there was a significant decrease in the percentage of errors ($P < 0.05$).

Symbol Rx was missing in 47% of the prescriptions. Some prescriptions had alternate symbols such as ADV, TT, or DIA

for Rx. Diagnosis and date were not mentioned in 56% of the prescriptions. Post session significant improvement was seen ($P < 0.05$).

Patient name was not written in 27% of the prescriptions. Age, gender, and address of the patient was not mentioned in 52%, 59%, and 56% of the prescriptions, respectively (Figure 2). Post session there was significant improvement in the patient-related information ($P < 0.05$).

All the drugs selected were appropriate for the given case scenarios. Only generic names of the drugs were mentioned. Dose, dose unit, dosage form, frequency, duration, and route of administration of the drugs were mentioned incorrectly in 64%, 62%, 52%, 56%, 57%, and 59% of the prescriptions, respectively. Strength of the drug and duration was not mentioned in 57% of the prescriptions (Figure 3). Some prescriptions had unauthorized abbreviations such as T or T/b for tablets, C or CP for capsules and O/D for once daily dosing. Significant improvement was seen in the drug-related components post interventional sessions ($P < 0.05$).

15% of the prescriptions had illegible and incomprehensible hand writing. Improvement was seen in the handwriting after the session. 60% of the prescriptions lacked information in capital letters, which improved significantly post intervention ($P < 0.05$) (Figure 4).

DISCUSSION

The main focus of this study was to evaluate the ability of the second-year medical students to write a prescription and also to assess the effectiveness of hands on training on appropriate prescription writing. Before conducting the educational interventional sessions, several lacunae were observed in the prescription writing of the medical students which improved significantly after the sessions.

In the prescriber information, (Figure 1) the prescriber name and signature was missing in 56% of the prescriptions, which is more than that reported by Mahato et al. 22%, Patel et al. 30%, but were lesser than that reported by Khan et al. 77% and Dharmadikari et al. 82%[18-21] The prescriber registration number was missing in 58% of the prescriptions, which is lesser as compared to the studies where it was not written in 85% and 77% of the prescriptions.[18,20] The use of personalized stamps bearing the prescribers name and registration number was found to be a useful and inexpensive method to improve the quality of the prescriptions.[22]

On further analysis, in 56% of the prescriptions dates were not written, which is lesser as compared to the study by Khan et al. (81%).[20] As the students were not aware of the legal status of the prescriptions. Presence of dates in the prescription is useful in monitoring the drug therapy and also during drug refills. Diagnosis, which is the most vital component was missing in 56% of the prescriptions, this was also noted in another study.[18] Failure to mention the diagnosis can cause problems during the follow-up visits. However, there was a significant improvement in the knowledge about the physician-related components of the prescription after the intervention and hands on training ($P < 0.05$) (Figure 1). According to the WHO, these elements are very essential while writing a prescription. Moreover, they are also very helpful to the pharmacist to clarify any doubts by contacting the prescriber.[23]

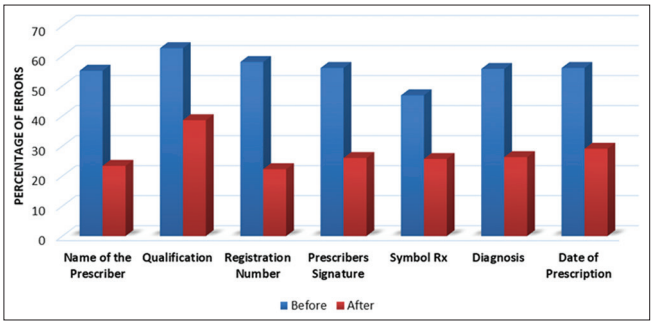

Figure 1: Prescriber information

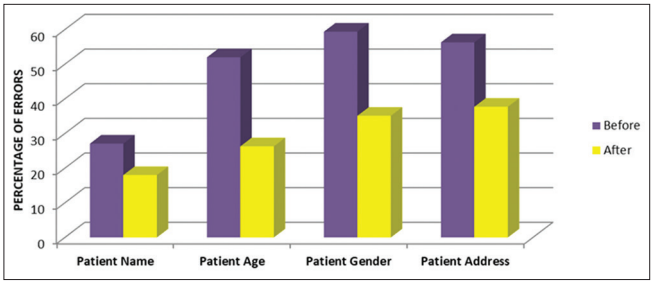

Figure 2: Patient information

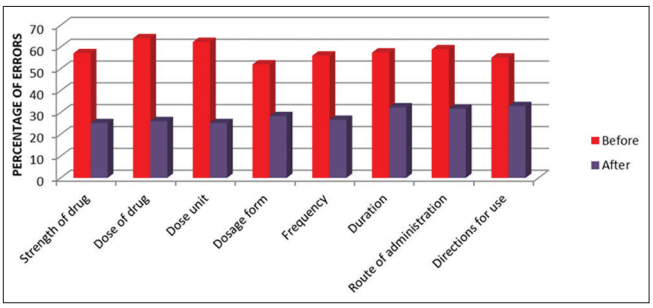

Figure 3: Drug-related components

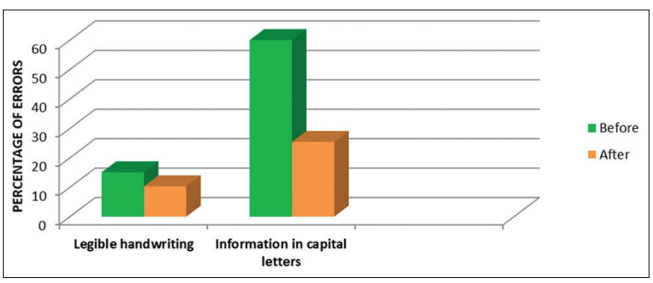

Figure 4: Other components

Lacunae were also observed in writing the patient information (Figure 2). Patient name and address were missing in 27% and 56% of the prescriptions. In one study, the address was missing in all the prescriptions.[21] The presence of name and address is useful in locating the patient in case of any prescribing or dispensing errors. Age and gender of the patient were missing in 52% and 59% of the prescriptions, respectively. Mentioning the age of the patient is a legal requirement, especially in children below 12 years. It is also essential to mention the gender of a patient, as drug response differs in male and female population. Deficiencies in writing the patient information were also observed in another study.[18] However, there was a significant improvement in writing the patient information after the educational interventional sessions ($P < 0.05$).

Deficiencies were also noted in writing the drug information part of the prescriptions (Figure. 3), this was observed in few studies done in the past.[18,21,24] In this study, the students were able to select appropriate drugs for the given case scenarios, as the cases chosen were based on problems that the students had studied as part of their curriculum. The students only wrote the generic names of the drug. As the brand names are not taught during the pharmacology lessons, so most of the students were unaware of them. Some students expressed that the brand names were difficult to remember. Writing generic names of the drugs gives flexibility to the dispensing pharmacist. Brand name drugs are costlier, but they can be used only when problems of bioavailability are expected.[25] In a study done by Sukhlecha et al., only 19.6% of the drugs were written in generic names[26] and in another study, 100% of the drugs were prescribed by the brand names.[27] However, the recent Medical Council of India (MCI) guidelines insist on writing drugs with generic names only.[28] Students can make use of the official formularies such as the National Formulary of India, Cochrane database for chosing appropriate drugs, this practice will be beneficial for them in their future while planning the treatment plan for their patients.[29]

On further analysis, it was noted that the dose of the drugs were written incorrectly in 62% of the prescriptions. This may cause serious consequences, in case adult doses are written for geriatric or pediatric patients. The strength of the drug was not mentioned in 57% of the prescriptions, similar observations were made in another study.[20] Writing drug strength is vital, as pharmaceutical products are available in different strengths. In 52% of the prescriptions, dosage forms of the drugs were written incorrectly or missing. Writing appropriate - dosage forms are essential to achieve desired therapeutic response. Omissions in writing the frequency of drug administration were noted in 56% of the prescriptions. This can contribute to toxicities and treatment failures. Irrational, ineffective prescribing can lead to needless polypharmacy, drug resistance, and drug interactions.[30]

55% of the prescriptions in this study, the directions for use for the patient were missing, as compared to another study where it was missing in 98% of the prescriptions.[20] This may be due to the belief that the directions and precautions to be taken will be explained to the patient by the dispensing pharmacists. However, during the session, the facilitators explained to the students that the prescribing doctor is legally responsible for the written prescriptions and not the dispensing pharmacists. Lapses in writing whether the drug should be taken before or after food, during day time, or before bedtime will also cause potential harm to the patient or may lead to failure of the treatment.[31]

Common prescribing errors such as wrong or inappropriate drug, dose or units, lack of awareness of drug interactions, choosing two drugs belonging to the same class, choosing wrong routes to give medications, infusions with no clear details of diluent, rate, and most importantly calculation errors, especially in pediatric prescriptions. The consequences of all these errors were explained in detail to the students during the educational interventional sessions. Significant improvement was seen in writing the drug information part after the educational intervention sessions ($P < 0.05$). Similar observations were seen in another study, where attending a 1 h interactive sessions by the medical students decreased the frequency of prescribing errors.[32]

In this study, 15% of the prescriptions were illegible (Figure 4), which is lesser than reported in a study by Mahato et al. 35%,[18] Abdella. 19%[24] and Dharmadikari et al. 26%.[21] The importance of legible handwriting and the completeness of the prescriptions was explained in detail by showing them examples of illegible prescriptions and medication errors which occurred due to the lapses in prescription writing. Post session there were only 10% of illegible prescriptions. The MCI has recently proposed a format for the prescription and also has given guidelines that all the drug-related information should be written in capital letters in a prescription.[28] In a study conducted by Saravanan et al.,[33] 68% of the students agreed that computerised transmission of prescriptions with the use of a standard prescription format will be helpful to avoid prescription-related errors. As they will have clear legibility, precise information about the drugs and also warnings on overdose of drugs and drug allergies.[22] However, in a government system, owing to patient overload, shortage of manpower and financial issues, use of such costly prescription writing software is still a farfetched idea.[6]

As most prescribing errors are caused by the interns and freshly graduated junior doctors, improving the undergraduate education and raising awareness to avoid prescription errors is very important. Conducting a 1 week training module consisting of seminars, discussions, and hands on training on drug-related problems was helpful in improving the prescribing skills of the medical students.[34] Significant improvement was also seen in the final-year dental students who attended a lecture on prescription writing as compared to the control group.[35] In the systematic review done by Kamarudin et al.,

it was suggested that educational interventional sessions were useful in improving the prescribing competencies of the medical students, by training them with the WHO guide to good prescribing.[36]

Introducing a standard prescribing chart, educating, and training the prescribers, conducting regular prescription writing exercises and prescription auditing workshops followed by clinical discussions are some of the measures which will help inculcate the habit of writing a rational prescription.[6] Educational interventional sessions should be combined with giving feedback to the prescribers, as this will give an opportunity for them to learn from their mistakes and will also increase the effectiveness of learning.[37] These sessions should also be conducted for nurses and pharmacists. As this will aid in detecting prescription errors before dispensing or administering the drugs.

Strengths and Limitations of the Study

In this study, two different forms of educational interventions were used, one a theoretical intervention in the form of a lecture and another hands on training on writing a rational prescription. These sessions were useful in minimizing the prescription errors significantly.

Limitation of our study is that the assessment was done with clinical scenarios which the students had studied as part of their curriculum. In this study, the main focus was on the basic components of the prescription, more elaborate sessions on rationality of prescribing needs to be conducted. Furthermore, further follow-up research needs to be done to see the long-time effects of this training on the students in avoiding prescription errors.

CONCLUSION

The quality of the health-care system can be improved by writing a safe and rational prescription, for this a good theoretical and practical aspect of teaching in prescription writing is essential. In this study, several lacunae were observed in the prescription writing skills of the second-year MBBS students, which improved significantly after the hands on training. Therefore, this method of training should be included as a part of pharmacology practical curriculum. Such sessions should be made compulsory for the pre-final, final-year medical students and for the interns joining the internship program.

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