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Research Article

ASSESSMENT OF HANDS-ON TRAINING ON INTERNS' PRESCRIPTION WRITING SKILLS AT A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objectives: This study was conducted with an objective to assess the prevalence of prescription errors and to compare the prescription writing skills of the interns' pre and post-teaching interventions on the appropriateness "prescription writing."

Methods: This research was conducted in a tertiary care teaching hospital Karwar Institute of Medical Sciences, Karwar. All interns posted to the orthopedics department as a part of rotatory internship postings during the 6 months from June 2021 were included in this research after receiving informed permission in writing. We gathered the written prescriptions for three distinct cases and a seminar and hands-on training about "prescription writing" was given. Subsequently, the interns were requested to re-write new prescriptions for the same three situations.

Results: A total of 390 prescriptions from 65 interns were gathered and analyzed. In 58%, 36%, 62%, and 78% of the prescriptions, date, diagnosis, prescriber's name and qualification were absent. In 44% and 12% of the prescriptions, the patient's age and name were not written, respectively. Following the hands-on teaching intervention, a noteworthy enhancement in the overall prescription writing was noted.

Conclusion: Interns often write prescriptions incorrectly because they do not retain the pharmacotherapeutic information that was given in the 2nd year of the undergraduate program. A teaching program of basic prescription writing is necessary to refresh their knowledge and prescription writing skills.

Keywords: Teaching program, Prescription writing, Interns, Prescribing errors.

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INTRODUCTION

A prescription is a written order from a recognized medical professional to the pharmacist that gives detailed instructions about the medicine to be given to a patient [1]. Medical professionals should acquire prescription writing as a fundamental and necessary skill during their undergraduate education. To write rational and safe prescriptions, a doctor must utilize critical thinking to apply their knowledge of both drugs and diseases. This is a complex but crucial skill [2]. Prescriptions are also considered legal documents; hence, the components of a prescription should be clearly written, free from writing errors and non-official abbreviations [3].

A well-balanced prescription will provide a patient with better therapeutic advantages, fewer side effects and a lower cost load. We need to assess the prescription-writing practices and errors to maintain the quality of the prescriptions. We can complete this evaluation using a variety of accessible tools [4].

The World Health Organization (WHO) has defined certain parameters as prescribing indicators to uphold rational drug use and to prevent irrational drug prescription. According to WHO, date of prescription, the name, the prescriber's address, Doctor's signature, name, strength and dosage form of the drug, total amount of the drug, name, age, and address of the patient are important for an ideal prescription [5]. After completing the final year examination of the MBBS course, an internship entails a medical apprenticeship under a registered medical practitioner's supervision. The intern gains knowledge of both clinical skills of performing procedures as well as management of patients with the help of good clinical judgment during the internship. They are junior most doctors employed in tertiary care facilities under supervision [6].

Under-prescribing, overprescribing, inappropriate prescribing, irrational prescribing and prescribing errors are examples of ineffective prescribing practices [7]. Medication errors are avoidable incidents that may result in patients being harmed or misusing medications [8]. A wrong prescription can be caused by choosing the incorrect drug, dosage, route of administration, frequency or duration of treatment, among other things. It can also result from failing to give proper consideration to the unique characteristics of the patient or any co-existing medical conditions. Inadequate consideration of potential harm caused by the given drug also leads to the wrong prescription [9]. Therefore, prescribing is a complex and high-risk intervention. Medication errors are found to occur more frequently when undergraduate students are not proficient prescribers, especially when it comes to interns [10]. Medical students and interns must receive education on the cognitive and decision-making processes involved in safe prescribing before they may write a prescription at the institutional level. Prescribing errors should be studied, analyzed and discussed at the individual, team and organizational levels [11]. Prescription writing errors are the most prevalent type of mistakes that may be avoided, making it a crucial area for improvement [12]. Good quality prescriptions will provide better patient care. The doctors become confident and competent in prescribing through targeted education programs [12-15]. Our study aimed to evaluate the intern's ability to write prescriptions both before and after receiving instruction on appropriate "prescription writing."

METHODS

A cross-sectional observational research was carried out at Karwar Institute of Medical Sciences Teaching Hospital, Karwar. All the interns posted in the orthopedics department as part of a compulsory-rotatory internship during 6 months starting from June 2021 were included in this research after receiving informed permission in writing.

We gathered the written prescriptions for three distinct cases. Following the prescription collection, a seminar on "prescription writing" which enlightened the rational prescription and the significance of each prescription component was held.

After the teaching intervention, they were made aware of the mistakes in the prescriptions they had written with detailed one-to-one discussions. They were shown sample prescriptions with unreadable handwriting and frequent prescribing mistakes and they were given a detailed explanation of the deleterious effects of these errors. The interns were then asked to re-write the prescriptions for the same three case scenarios. The students received comments to enhance their prescription knowledge for future use after the prescriptions were carefully examined.

The WHO's core prescribing indicators and guidelines on good prescribing practices were used to evaluate the interns' prescription writing skills. Two primary criteria were used to evaluate each prescription's completeness [1].

1. Components linked to prescriber:
   a. Prescriber details: Name, registration number, qualification, signature, prescription date, symbol Rx ("take thou") and diagnosis.
   b. Patient details: Patient name, gender, age and address.

2. Drug details: Appropriateness of the selected drug, strength and dose of the drug, dosage form, duration, frequency, route of administration, dose unit and instructions for use.
3. Miscellaneous components: Drug information in capital letters and legible handwriting.

Version 26 of the Statistical Package for the Social Sciences was used to analyze data from the prescription after compiling in the Excel sheet. Z test was used for testing the significant difference between proportions. At $p<0.05$, the significance threshold was set.

RESULTS

Sixty-five interns were enrolled in the study. A total of 390 prescriptions including 195 pre-teaching and 195 post-teaching interventions were collected and data was entered in Microsoft Excel sheet and analysis was done using descriptive statistics.

Prescriptions were analyzed, which showed that, in 58%, 36%, 62%, and 78% of the prescriptions, the date, diagnosis, prescriber's name and qualification were absent (Fig. 1). The percentage of mistakes decreased significantly ($p<0.0001$) following the teaching intervention.

Forty-four percent of the prescriptions had a missing symbol (Rx). In more than 40% of the prescriptions, the patient's age or sex was not written and 12% of the prescriptions did not have the patient's name (Table 1). After the teaching intervention, there was a noteworthy enhancement in data related to the prescriber and patient ($p<0.0001$).

Every medication chosen was suitable for the cases that were provided. The medications were only specified by their generic names. Handwriting in 23% of the prescriptions was unreadable and illegible. Fig. 2 and Table 2 show that after the teaching intervention, there was a substantial improvement ($p<0.0001$) in the prescriptions that included missing drug information and drugs in capital letters.

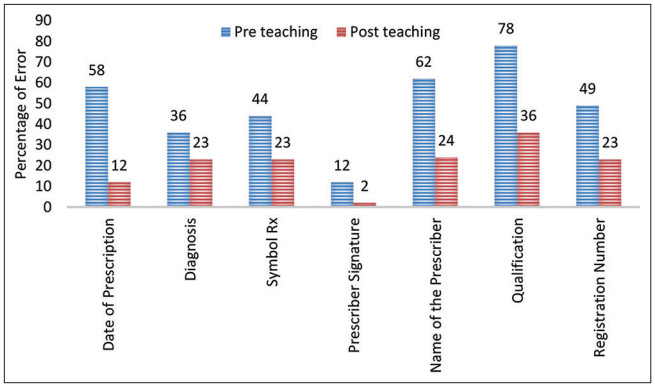

Fig. 1: Prescriptions lacking prescriber's details

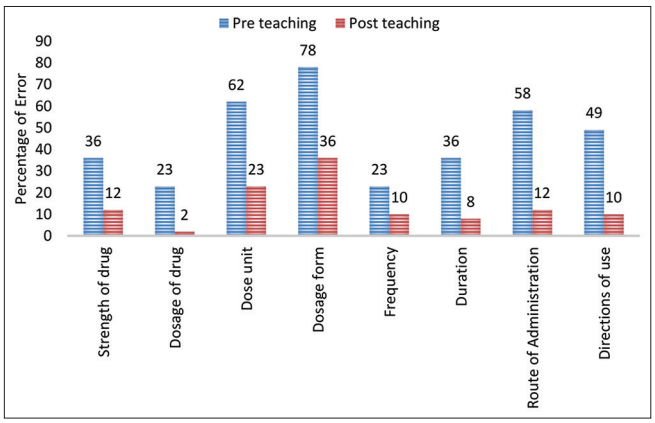

Fig. 2: Prescriptions lacking drug details

Table 1: Prescribing errors in patient information

S. No.	Patient-related details	Pre-teaching (%)	Post-teaching (%)	p-value (Z-test)
1	Name	12	2	0.00008*
2	Age	44	23	<0.0001*
3	Gender	49	23	<0.0001*
4	Address	78	44	<0.0001*

*Significant

Table 2: Prescribing errors related to miscellaneous components

S. No.	Miscellaneous components	Pre-teaching (%)	Post-teaching (%)	p-value (Z-test)
1	Legible handwriting	23	2	<0.0001*
2	Drug name in capital letter	62	23	<0.0001*

*Significant

DISCUSSION

The current study was done to determine the interns' prescription writing skills who were posted in the orthopedic department based on their previously learned knowledge and also to evaluate the usefulness of hands-on teaching intervention on "prescription writing." We observed that the majority of the prescriptions written by interns lacked one or the other prescription components before the teaching intervention which improved significantly following the teaching intervention.

A prescription must contain the prescriber's name, registration number and credentials for the pharmacist to confirm it. It is difficult for patients to follow-up on their medical condition and for pharmacists to communicate when there is a lack of information about the prescriber [16]. In our study, 62% of the prescriptions did not contain the prescriber's name which was more than the studies by Raghu *et al*. [14] (56%) and Khan *et al*. [17] (60.7%) while lesser than the study by Dharmadikari *et al*. [18] (82.2%). Qualification of the prescriber was not mentioned in 78% of the prescriptions, which is higher than that reported by Raghu *et al*. [14] (60%). Forty-nine percent of the prescriptions lacked the prescriber's registration number which was much lower than those reported by the above-mentioned studies [14,17,18]. The prescription quality can be improved by using a customized stamp with the name and registration number of the prescriber printed on it [19].

Dates on the prescriptions are helpful for tracking medication therapy and for refilling prescriptions. In the present study, we found that 58% of the prescriptions did not contain dates while a higher percentage was reported by Khan *et al*. [17] (81%). The reason may be because the interns were naive to the legal consequences of not writing the date. The most important component of the prescription – the diagnosis was absent in 36% of the prescriptions, a much higher percentage was found in another study [14]. During follow-up appointments, issues may arise if the diagnosis is not mentioned [14]. Although there was missing information about the prescriber's details, we observed a significant improvement after the teaching intervention.

Patient details such as name, gender, age and address are required to identify the correct patient and also to contact in situations of any dispensing or prescribing errors [16]. We noticed many errors related to the patient data in our study. Among the 195 pre-teaching intervention prescriptions, 44% and 49% lacked the patient's age and gender respectively, which is less than a study by Raghu *et al*. [14] (52% and 59%, respectively). Particularly when dealing with younger patients, the patient's age has legal importance [14]. Given that the pharmacological response varies between the male and female populations, it is imperative to additionally specify the patient's gender. There was a significant reduction in the errors of patient-related information after the teaching intervention, which was also reported by various studies [14,20].

In our study, we observed that interns made some mistakes in writing drug details, which was also reported by various studies [14,17,18]. The interns prescribed appropriate medications for the three case scenarios given. A study by Raghu *et al*. [14] and Gupta *et al*. [20] also reported the same. All the drugs were given by their generic names, as the interns were unaware of the brand names of the drugs; which are seldom discussed in pharmacology lectures. This was similar to a study by Raghu *et al*. [14] and in contrast to a study by Gupta *et al*. (62%) [20]. The latest recommendations from the National Medical Commission (NMC) mandate that medications be written under their generic names only [21].

Medication errors observed in our study were as follows; drug dose, strength, dose unit and dosage form were not mentioned in 23%, 36%, 62%, and 78% of the prescriptions, respectively. Similar errors were reported by other studies [14,17]. If adult dosages are prescribed for elderly or pediatric patients, it may lead to toxicities. Medications come in a variety of strengths, thus writing the medicine strength is essential. To attain the intended therapeutic response, writing suitable dosage forms is crucial. All these medication errors can cause therapy failures and toxicities [22]. All the medication-related errors decreased significantly following the teaching intervention which was also observed in other studies [14,20].

In our study, the "signatura" that is the instructions to the patient regarding drug use on how, how much, when and how long to take the medicines was absent in 49% of the prescriptions, although it was much higher in another study (98%) [17]. This study found that 23% of the prescriptions were unreadable, which is higher than that stated by Raghu *et al*. (15%) [14] and less than that mentioned by Dharmadikari *et al*. (26%) [18]. Recently, NMC suggested a structure for the prescription and provided rules stating that all drug-related data must be written in capital letters [21].

Chaudhari *et al* quoted that knowledge of the prudent use of medications was lacking and this may be changed by incorporating the fundamentals of prescribing into the training of recently graduated medical students [23]. Desai *et al*., in their study, found that the clinical pharmacology and rational therapies training received in the undergraduate program is not carried over to the internship [24]. Similar findings were noted in our study. Narwane *et al*. and Venkatesan *et al*., reported that a training session improves interns' prescription skills [13,25]. Ajemigbitse reported a reduction in errors of prescription among doctors on providing prescription education and feedback [26]. A significant reduction in medication errors was also found in our research which supports the findings of the studies mentioned above.

Strengths and limitations

A theoretical discussion delivered as a seminar and a hands-on training session on drafting a logical prescription were the two types of educational interventions employed in this study. These sessions were helpful in greatly reducing prescription mistakes. Our study's limitation stems from the fact that the intern's coursework included clinical situations for the evaluation. The study's primary emphasis was on the fundamental elements of the prescription; in-depth discussions on the rationality of prescribing should be held. In addition, further studies are necessary to determine how this teaching intervention prevents the interns from committing prescribing errors over the long term.

CONCLUSION

Writing safe and logical prescriptions may enhance the standard of the health-care system; thus, a solid theoretical and practical education in writing prescriptions is crucial. With poor retention of pharmacotherapeutic knowledge which was taught in the 2nd year of under graduation course, interns tend to commit prescription writing mistakes. A teaching program of basic prescription writing and essential components of a prescription is necessary to refresh their knowledge and prescription writing skills.

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AUTHOR'S CONTRIBUTION

All the authors have contributed in the concept and plan of the research or acquisition, analysis and interpretation of data, drafting and revising the document for vital intellectual content and final consent for the version which is going to be published.

CONFLICTS OF INTEREST

None declared.

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