Prescription Writing: The Forgotten Art

ABSTRACT

Prescription is one of the most important therapeutic transactions between physician and patient. Prescription errors contribute to a significant rise in adverse events. These errors in prescribing can be classified into; physician-related or drug-related errors. The present study was conducted to assess the extent of noncompliance with prescription writing requirements. This cross sectional study was conducted in the Moradabad city in Uttar Pradesh state, India, in the month of November 2012. Prescriptions were collected for 15 days from out-patient departments of private hospitals, district hospital and drug stores on Probability Proportional to Enrolment size (PPE) in the Moradabad city after acquiring a verbal consent from prescription holders. All prescriptions were assessed retrospectively. The significance of differences was sought using Mann–Whitney U tests. Out of 736 prescriptions, 586 prescriptions were selected which included 442 Medical and 144 Dental prescriptions. Discrepancies in components of; registration number, address, Rx, drug quantity were found in more than 50%; errors in prescribers identity, degree, signature, age, sex, strength of drug, and direction were seen in less than 50%. Out of the total prescriptions with errors, 58% were written by medical practitioners. The results of the present study denote that there exists a low obedience rate to the procedural requirements in writing of a prescription.

KEYWORDS prescriptions; dental prescriptions; prescription errors; prescription writing

INTRODUCTION

Prescription is one of the most vital therapeutic transactions between physician and patient. The art of prescription writing is a prehistoric heritage whose origin is lost in the distant past however its importance through the centuries has made it one of the utmost important written communications of the human race.

Prescribing is the act of specifying one or more drugs to be administered or taken by the patient, including dosage and duration of the treatment. It is a personalized and dynamic clinical process. In spite of its unique characteristics, prescription designs may be influenced by social, cultural, economic, or promotional factors. Proper prescription writing, which is a crucial skill for doctors in all medical specialties, is the principal intervention that doctors offer to the suffering humanity.

Most medical students at the start of clinical training don’t have a clear awareness about prescribing a drug or information they need to provide to the patients. This is generally because their pharmacology exercise focuses initially on theory than on practice. Most junior doctors are unaware of the fact that prescription errors may contribute to a substantial increase in reported hospital adverse happenings and subsequent medicolegal problems. Prescription inadequacies form a large amount of errors recognized in prescription screening. The common forms of medical error include prescribing, dispensing, and medication administration errors.

Errors in prescribing may be classified into two main types, errors of omission and errors of commission. While according to Lofholm and Katzung (2001), the prescription is divided into two broad components: physician-related and drug-related.

Prescribing errors are common, most of them are minor while some can be a basis of patient harm. Moreover, studies on the prescribing mistakes in India appear scarce. Some available studies done in teaching institutions highlight the matter of errors in prescription writing by medical students...
and interns. However, studies on prescriptions of private practitioners have not been conducted. Therefore, the present study was conducted to assess the magnitude of nonfulfillment with prescription writing necessities as well as to detect the types of prescribing errors made by medical and dental practitioners.

**MATERIALS AND METHODS**

This study was conducted in the Moradabad city in Uttar Pradesh state, India. The study protocol was approved by the Institutional ethical committee. The study was conducted in the month of November 2012. Prescriptions were collected from the out-patient department (OPD) of Dental hospital, District hospital and Drug Stores having the highest number of daily prescriptions. The prescriptions were collected for 15 days by a single investigator from the patients holding the prescriptions. Prescriptions were collected on Probability Proportional to Enrolment size (PPE) i.e. hospitals and Drug Stores receiving the highest number of daily prescriptions were more likely to be selected than those receiving low number of prescriptions. Patients who were holding the prescription were asked and their consent was the criteria for selection of the prescriptions. Similarly, at the drug stores the verbal consent was acquired from the counter sales executives.

All the prescriptions were audited retrospectively for physician-related components and drug-related components as classified by Lofholm and Katzung (2001) (Table 1).

The data were analyzed using a prescription as a unit. The primary analysis included all prescription who satisfied the inclusion criteria. Data were entered into an Excel Sheet database (MS Office Excel 2000; Microsoft Corporation, Redmond, WA, USA). The Data was analyzed using Minitab 16.1.1 version of statistical software. The significance of differences within the groups (over the course of the study) was sought using Mann Whitney U tests, and among groups (at each time point) using Wilcoxon matched pairs test by ranks.

**RESULTS**

Out of the total 736 prescriptions collected within 15 days of the study, only 586 new prescriptions were included in the study. Repeat prescriptions and prescriptions from unauthorized practitioners were excluded. Out of the selected prescriptions 442 were from Medical practitioners and 144 were from Dental surgeons. All the selected prescriptions were analyzed.

Table 2 presents the percentage distribution of the presence and absence of different components which were assessed in the prescriptions. Discrepancies in components of registration number of prescriber, patients registration number, patients address, symbol Rx (‘Take Thou’) and the drug quantity to be dispensed found to be present in more than 50% of the prescriptions. Discrepancies in components of Prescribers identity, Professional Degree, Prescribers Signature, age, sex, strength of the drug, and direction of the use of

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*Handwriting was legible in prescriptions in column ‘present’ and illegible in columns ‘absent’.

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drug was seen in less than 50%, while components as prescribers address, date of prescription, and dosage form were absent in less than 20% of the analyzed prescriptions.

Table 3 presents the assessment of the physician-related components in the prescriptions with comparison between the medical and dental practitioners. Out of the total prescriptions the 75% of medical and 93.05% prescriptions of dental practitioners had patients address missing in them. This was followed missing ‘Rx’ (take thou) symbol which was missing in 68.77% prescriptions from medical practitioners and only 25% prescriptions from dental practitioners. Registration number of Doctor as well as patient registration number (Medical Record Number/MRD) were found to be missing more often in dental prescriptions (91.67 and 84.72%) as compared to those written by medical practitioners (67.42 & 61.76%). However, prescriber’s identity and professional degree was missing more in the prescriptions of medical professionals (44.34% and 46.15%) as compared to dental counterparts (41.67% and 43.05%). Moreover, the prescriber’s signature was seen missing in 52.03% medical prescriptions and only 26.38% dental prescriptions. Missing Age and Sex of the patients was also seen higher among the prescriptions written by medical practitioners (27.6 and 39.27%) as compared to those of dental practitioners (12.5 and 15.27%). The least discrepancies were found in the presence of prescribers address, date of the prescription and patient’s identity.

A significant difference was registered between the discrepancies in the physician-related components made by medical and dental professionals ($P = 0.0011$).

Table 4 presents the percentage distribution of discrepancies in the drug-related components of the prescriptions. Prescriptions from the medical practitioners

*Calculated by Mann–Whitney $U$ test $P$-value significant at $P \leq 0.05$.

*Calculated by Mann–Whitney $U$ test $P$-value significant at $P \leq 0.05$, Other than drug-related components.
presented a higher number of errors within the components of drug quantity to be dispensed and the direction of use of drug (82.35 and 47.96%) in comparison to dental prescriptions (70.83 and 33.34%). Similar results were also present for writing the strength of the drug (40.27% versus 13.88%). Least discrepancies were found in writing of the drug form (Tablet, Capsule, etc.), only 8.59% medical and 5.55% dental prescriptions were having errors in this component. A significant difference was registered between the discrepancies in the drug-related components made by medical and dental professionals (P = 0.036).

While the legibility and readability of the written prescriptions were also assessed and it was found that prescriptions written by the medical professionals were more untidy than the ones written by dental practitioners.

**DISCUSSION**

Medical errors are a most important issue in healthcare. The National Coordinating Council for Medication Error and Prevention defines a medication error as “any preventable event that may cause or lead to inappropriate medication use or patient harm, while it is in the control of the health care professional, patient, or consumer.” Such actions may be associated to professional practice, health care products, procedures, and systems including: prescribing; communication; labeling; packaging; nomenclature; compounding; dispensing; distribution; administration; education and monitoring.

In the present study prescriptions were collected from sites which included general hospitals, dental OPD and drug stores receiving the highest number of the prescriptions. 586 new prescriptions were analyzed for prescribing errors. The results of the present study revealed that errors were present in almost all of the analyzed prescriptions. It was quite evident that only a less number of personal were alert of the correct prescription writing. Previously Benzinam et al., Sequeira et al. and many other studies have also reported inconsistencies in the prescriptions.

In the present study, discrepancies in components of registration number of prescriber, patient’s registration number, patients address, symbol Rx (Take Thou’) and the drug quantity to be dispensed were found to be present in more than 50% of the prescriptions. Concurrent to these findings similar results were found by a previous study done in Nepal where 60.3% discrepancies were found in patient address while errors in writing symbol Rx was seen in 85.0%. Likewise, Rekha B et al. also has previously reported that patient registration number was missing in 100% prescriptions from a teaching hospital in Dehradun. On contrary Ni et al., found errors in patient’s registration number to be present in only 0.5% in Kuala Lampur. While previous findings reported that about 99.0% of the BDS as well as MBBS second and third year students wrote these components properly while in their medical training.

Inconsistencies in components as Prescribers identity, Professional Degree, Prescribers Signature, age, sex, strength of the drug, and direction of the use of drug was seen in less than 50%, while components as prescribers address, date of prescription, and dosage form were absent in less than 20% of the analyzed prescriptions. Similar findings have been reported earlier from a hospital in London, where prescribing errors were identified in 13.2% of all medication orders and most common type of error found was incomplete prescription (41.2% of all errors), and the third most common error was dosing errors (11.3%) However, while Ni et al., have previously reported that, 36.4% prescriptions had no mention of dosage, while 80% did not have the dosage from mentioned in them, 32.7% did not mention the name of patient, 17.1% didn’t have date written, while 16.1 had missing prescribers signature in them. All these reported errors are similar to the findings of the present study.

Errors in prescription may sometimes pose a grave threat to the patient and being a medical carelessness can invite legal trouble for the prescriber. As in the present study 33.78% prescriptions had no mention of drug strength, this omission of the strength required or dosage form may not pose any problem if the drug prescribed is available in single strength or dosage form. However, with the rapid advances in drug development, many drugs are available in several strengths and dosage forms and hence this type of error may pose grave problems. Furthermore, in the present study 79.52% prescriptions did not have mention of quantity to be dispensed. Many drugs may be given on “as required” basis, based on the patient’s medical requirement. The absence of quantity can cause over dosage or more expenditure to the patients. More serious concern can be addiction to many drugs and misuse of prescription in the form of self-medication. As reported by the American College of Preventive Medicine, the analgesic abuse has increased dramatically. Moreover, as reported earlier deaths from accidental drug overdoses have also shown steep rise since 1990 and rates have increased roughly five-fold.

The present study also provides an insight into differences in prescription writing skill amongst medical practitioners and dental practitioners. The results show that prescribing negligence was more common in medical practitioners than dental practitioners 58% and 42% respectively. However, this has not been reported elsewhere and the data to support these findings is not present. However, a study conducted in a teaching institute in Nepal has revealed that the medical and dental graduate students make less mistakes as compared to the mistakes made by senior doctors in both the fields.

The most likely reason for more inconsistencies in prescriptions of Medical professionals can be that they carry a burden of heavy patient flow and the paucity of time can also be a concern for them as they counsel more patients in a day in comparison to the dental counterparts. It has been
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reported earlier that longer consultation and shorter patients’ list enable doctors to provide a better care\textsuperscript{17}. Bener et al., in a previous study from Qatar reported that the average consultation time at the Hamad General Hospital by a general medical practitioner ranged from 7.0 to 17.4 minutes with inter-practice variation in consultation length\textsuperscript{18}. While in comparison the time taken during a dental consultation is often longer. It has been reported earlier that not all dental patients require the same amount of time yet a standard 45 to 60 minute appointment, regardless of the procedures is required\textsuperscript{19}.

Although lesser errors by dental than medical professionals have been reported in the present study, however many studies have reported that dentists often do not have the proper pharmacological knowledge and therefore sometimes make prescription errors\textsuperscript{20}.

Furthermore, prescribing errors can also be due to the attitude of several prescribers who are at all times in an urgency and hence unenthusiastic to spend little more time in writing clear and complete prescriptions. Other cause responsible for such errors can be that pharmacology training of medical/dental students is more focused on theory than on practice thus retaining of the ideal prescription writing guidelines may be difficult. However the prescription must be written with utmost care of, the components. Evidence suggests that harm due to prescription and medication errors has been higher on children than on adults\textsuperscript{21}.

In the present study, the researcher could not read 36.17% prescriptions properly, similar findings have also been reported earlier by Ni et al., and Ghaleb et al.\textsuperscript{7,14} Illegible handwriting can lead to misinterpretations of dosage, drug name, or abbreviations. Though, readability and legibility evaluation is quite subjective, but assessment of this parameter is subjected to evaluator’s familiarity with the handwriting of a prescriber and the information it provides. However, it should always be emphasized that prescriptions should be written legibly so that they can be easily read by anyone.

A previous report has revealed that Texas jury has ordered a doctor who wrote an illegible prescription to pay $225,000 compensation to the patient’s family\textsuperscript{22}. Three policies have been issued over the past 7 years by the American Medical Association which have urged doctors worldwide to “improve the legibility of handwritten orders for medications” and also to review all orders for accuracy and legibility. Doctors with poor handwriting have also been directed to use computerized order entry systems or at least to print or type medication orders\textsuperscript{21}.

Errors of prescribing in the form of incomplete or no drug information to the patient can cause differences between the doctor’s prescription and what the patient takes in actual practice. The effect of medication misuse because of these inconsistencies can lead to morbidity and mortality. Proper prescription writing, which is an important skill for doctors in medical specialties, is the principal intervention that doctors offer to the suffering humanity\textsuperscript{23}. Surprisingly, there has been little research into the reasons why prescribing errors occur.

Theories of human error have been recently used to analyze errors in high-risk environments and have more recently been applied to medicine\textsuperscript{24}. There are various methods to the study of human error but we recommend that “Reason’s accident causation model” shall be used which is based on the hypothesis that ‘active failures’ on the part of front-line individuals are mostly the outcome of the conditions in which they work, often termed “error producing conditions”\textsuperscript{25}. These in turn are the result of imperfect decisions at an organizational level, known as ‘latent conditions’. Utilizing this approach there is less attention on the individual who makes the error and more on preexistent organizational factors. The benefit of using this method is that it helps the identification of significant latent conditions, the primary focus of intervention\textsuperscript{26}. Such intervention at organizational level will be extremely useful in decreasing these inconsistencies.

Most of the junior doctors are ignorant of the fact that such prescribing errors may contribute to a substantial increase in reported hospital adverse happenings and subsequent medico-legal complications. So a doctor in the practical field should have clear knowledge about prescribing safely and correctly and for this knowledge, understanding, skill and attitude is essential. We recommend that the guidelines for proper prescription writing shall be judiciously followed by a medical or a dental professional as prescription mistakes might lead to a simple overdose or a lethal injury to a patient, and moreover a medico-legal concern to the practitioner.

While collection of the prescriptions the medical practitioners were not aware about the aim of the study as this could have affected the outcome of the study, thus decreasing the chances of bias. Furthermore, there are no universally accepted guidelines for handwriting assessment judging for readability and legibility which remain as a limitation. Moreover, this study was conducted in a single city, further studies shall be done which shall include a wider research area. Though there might be certain limitations in the study but those should not overrule the errors in prescription writing of the medical or dental practitioners.

Conclusion

The results of the present study signify that there exists a small compliance rate to the procedural necessities in writing of a prescription. There is a clear requirement for pharmacy and medical educators to stress the significance of writing prescriptions completely and legibly. Moreover, there is a requisite for the implementation of educational and monitoring programs to bring additional and continuous awareness to both medical and dental professionals and all concerned institutions so that they reduce the rate of incidence of prescribing mistakes.
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