

A COMPREHENSIVE ANALYSIS OF DRUG PRESCRIBING PRACTICES OF DOCTORS AND COMPLETENESS OF PRESCRIPTION IN A GOVERNMENT MEDICAL COLLEGE IN NORTHERN INDIA

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ABSTRACT

Objective: This study was designed to analyze the drug prescribing practices of doctors and completeness of prescriptions in a government medical college in Northern India.

Methods: A total of 2155 prescriptions were evaluated for adequacy of information related to prescribed drugs and completeness of information related to patients and doctors.

Results: The weight of the patient was written only in 1.90% prescriptions. The diagnosis was not written on 43.85% prescriptions. A total number of drugs prescribed in all the prescriptions was 6998. The average number of drugs per prescription was found to be 3.25 ± 0.24 . Out of these, 64.10% were prescribed by brand names. About 69.14% of drugs were prescribed in the form of tablets. Route of administration was not found to be mentioned for 86.08% drugs. For 53.90% drugs, dose was not mentioned. The name of the prescribing doctor was mentioned in 1.95% prescriptions only.

Conclusion: The study revealed that many prescriptions lacked crucial components of information pertaining to the drugs prescribed and the prescribing doctor. There is a vast scope for improvement by the prescribers.

Keywords: Prescription, Legibility, Prescribing practices, Patient particulars, Drug-related information, Doctors' particular.

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INTRODUCTION

A written prescription is the prescriber's order to prepare or dispense a specific treatment, usually drugs, for a specific patient [1]. It should not only be legible for cosmetic reasons, but it is a legal obligation as well. It should contain all the essential details regarding the prescribing doctor, the patient, the drugs, and any other instructions for the pharmacist or the patient. A prescription has four parts: Superscription, inscription, transcription, and subscription [2].

Superscription consists of information that is required for the identification of the patient, for whom the prescription is written, and the physician, who wrote the prescription. It contains the name and address of the doctor and hospital from where the prescription has been issued. It also contains name, age, sex, address, weight, outpatient department (OPD) number, etc., of the patient. Another important component of superscription is \mathcal{R} , which is a symbol that means "recipe" an abbreviation of the late Latin verb *recipere*, meaning "to take" or "take thou."

The part that determines which drugs are to be given to a particular patient is inscription. It contains all the drug-related information such as name of the drugs, their route, dosage form, dose, frequency, and duration for which the drugs have to be taken. A drug can have three types of names, a chemical name, a non-proprietary name, and a proprietary or brand name. The drug-related information should be complete in terms of name of drug, dosage form of drug, dose of drug, route of administration, and frequency of administration. The duration for which the drugs have to be taken should also be mentioned clearly. If there are some specific instructions regarding administration of drugs, they should also be mentioned.

The presence of signatures and official stamp of the prescribing doctor is also important for the legal validity of a prescription. Apart

from these, there are many additional things that sometimes are of mentionable importance such as specialty and registration number of the prescribing doctor.

Further, there are certain guidelines and norms that are to be followed while prescribing drugs. The World Health Organization (WHO) has formulated five core prescribing indicators: Average number of drugs prescribed per patient per encounter, percentage of medicines prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed, percentage of medicines from essential drug list prescribed, and WHO has also given optimal values for these indicators [3,4]. Medical Council of India (MCI) lays stress on prescribing drugs by generic names and in capital letters [5]. It also makes it compulsory to mention prescribing doctors' names and medical council registration numbers on the prescription. In this study, we have tried to analyze the prescriptions for drug prescribing practices and completeness of information related to patients and doctors.

METHODS

This study was executed in Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat. Photocopies of 2155 prescriptions were collected from the patients attending the OPDs of the hospital and analyzed after taking their written informed consent. Using a pro forma for each prescription, drug-related information was gathered and compiled in tabulated form. The legibility of the prescriptions was studied. Completeness of patient-related information such as name, age, sex, OPD number, address, date, diagnosis, and chief complaints was checked on all the prescriptions. The drug prescribing patterns in terms of the total number of drugs prescribed, number of drugs prescribed by generic and brand names, dosage forms, route of administration, and frequency of administration were assessed.

The prescriptions were also checked for the use of abbreviations, mentioning of drug doses, duration of treatment, and any specific instructions regarding administration of drugs (e.g., to be taken empty stomach, and to be taken with milk). The availability of prescribed drugs at the hospital pharmacy was also checked. The prescriptions were also scrutinized for presence of drug class duplication, use of fixed-dose combinations (FDC), and use of drugs from National List of Essential Medicines (NLEM). The use of capital letters while writing drug names and inclusion of drug allergy history of the patient was also assessed. The categories to which prescribed drugs belonged were also checked. Doctors' particulars such as name, registration number, signature, specialty, and stamp were also checked on the prescription slips. After checking legibility, various patient-related, drug-related, and doctor related attributes, data from all the prescriptions were compiled to prepare the results. Data were presented in the form of absolute numbers and percentages.

RESULTS

Out of the total of 2155 prescriptions, 1458 (67.66%) prescriptions were found to be clearly legible. Six hundred and forty-seven (30.02%) prescriptions were legible, but with effort and 50 (2.32%) prescriptions were illegible.

The patient-related information consisted of printed and handwritten parts. Name, age, sex, OPD number, address of patient, and date were present in all the 2155 prescriptions in printed form. The weight of the patient was written only in 41 (1.90%) prescriptions. A provisional diagnosis of the condition of the patient was mentioned on 51 (2.37%) prescriptions, while a final diagnosis was written on 792 (36.75%) prescriptions. The diagnosis was not written on 945 (43.85%) prescriptions and in 367 (17.03%) prescriptions, the diagnosis was written, but it was unclear. Chief complaints of the patients were mentioned in chronological order in 173 (8.03%) prescriptions. In 865 (40.14%) prescriptions, the chief complaints were mentioned, but they were not in chronological order. 1117 (51.83%) prescriptions contained no mention of chief complaints of the patient.

A total of 6998 drugs were found to be prescribed collectively in 2155 prescriptions. The average number of drugs per prescription was calculated to be 3.25 ± 0.24 . The number of drugs prescribed in the prescriptions is shown in Table 1.

Out of all the drugs, 64.10% were prescribed by brand names. The most commonly prescribed dosage form was tablet (69.14%), as shown in Fig. 1.

For about 53.9% of the drugs, the dose was not mentioned. Route of administration was not found to be mentioned for 86.08% drugs, as shown in Table 2.

About 34.75% of the drugs were prescribed to be taken on once-daily basis. The frequency of administration of prescribed drugs is shown in Fig. 2.

Specific instructions for administration of the medicines (e.g., to be taken empty stomach, and to be taken with milk) were mentioned for 26.34% of the drugs. The total duration of treatment was found to be missing in 777 (36.06%) of the prescriptions. The most commonly prescribed category of drugs prescribed was antacids (24.27%), as show in Table 3.

Drug class duplication was found to be present in 17.68% prescriptions. FDCs were prescribed in 46.27% prescriptions, and the total percentage of FDCs out of all drugs was 17.36%. The percentage of drugs that belonged to the NLEM was 76.36%. Out of all the prescribed drugs, only 64.63% were available at hospital pharmacies. The use of abbreviations was found to be done in all the prescriptions. In none of the prescriptions,

Table 1: Number of drugs prescribed in a prescription

| Number of drugs | Number of prescriptions (Out of 2155) | Percentage of Prescriptions |
|-----------------|---------------------------------------|-----------------------------|
| Zero | 25 | 1.15 |
| One | 223 | 10.35 |
| Two | 539 | 25 |
| Three | 493 | 22.87 |
| Four | 455 | 21.11 |
| Five | 251 | 11.65 |
| Six | 95 | 4.40 |
| Seven | 41 | 1.90 |
| Eight | 19 | 0.88 |
| Nine | 12 | 0.55 |
| Ten | 3 | 0.14 |

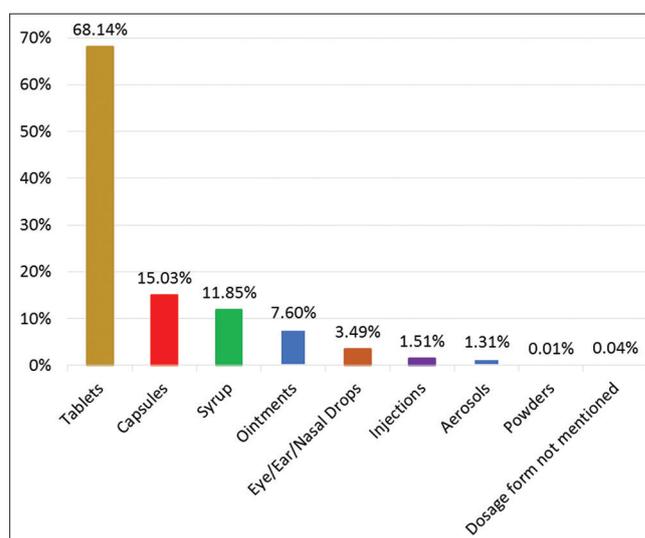


Fig. 1: Percentages of drugs prescribed in various dosage forms

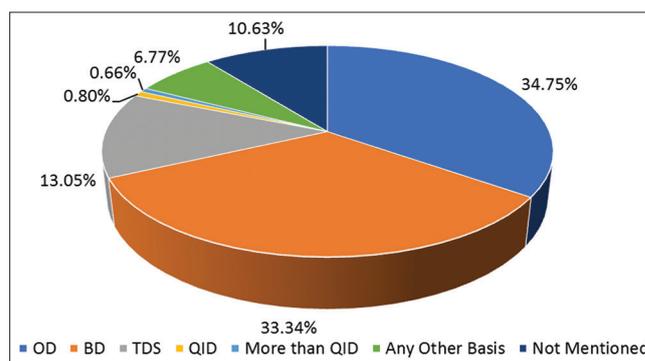


Fig. 2: Frequency of administration of prescribed drugs

the names of drugs were written in capital alphabets. The drug allergy history of the patient was not mentioned in any of the prescriptions.

The name of the prescribing doctor was not mentioned in 98.05% of the prescriptions. The registration number of the doctor was present in none of the prescriptions, as shown in Fig. 3.

DISCUSSION

In our study, 67.66% of prescriptions were found to be clearly legible. In studies conducted by Saini *et al.* and Rathish *et al.*, the percentage of legible prescriptions was found to be 66% and 26%, respectively, showing wide variability [6,7].

Table 2: Route of administration of drugs

| Route of administration | Number of drugs (Out of 6998) | Percentage of drugs |
|---|-------------------------------|---------------------|
| Topical | 799 | 11.42 |
| Parenteral (intravenous/intramuscular/subcutaneous/intradermal) | 106 | 1.51 |
| Inhalational | 69 | 0.99 |
| Oral | 0 | 0 |
| Sublingual | 0 | 0 |
| Per-rectal | 0 | 0 |
| Transdermal | 0 | 0 |
| Route of administration not mentioned | 6024 | 86.08 |

Table 3: Categories of prescribed drugs

| Category of drugs | Number of drugs (Out of 6998) | Percentage of drugs |
|--------------------------------------|-------------------------------|---------------------|
| Antacids | 1699 | 24.27 |
| Nonsteroidal anti-inflammatory drugs | 1547 | 22.10 |
| Drugs specific to disease | 1405 | 20.09 |
| Antibiotics | 1132 | 16.17 |
| Supplements | 751 | 10.73 |
| Steroids | 464 | 6.64 |
| Opioid analgesics | 0 | 0 |

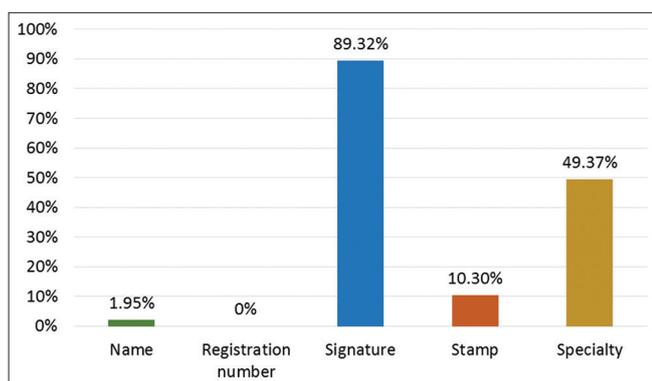


Fig. 3: Doctor related information

In our study, 43.85% prescriptions diagnosis was not mentioned, while chief complaints were not mentioned in 51.83% prescriptions. Rathod *et al.* found that the chief complaints and diagnoses were not mentioned in about 85% of the prescriptions [8]. The weight of the patient was written only in 41 (1.90%) prescriptions of our study. Some previous studies have shown similar lower values regarding weight, like 11.29% in study by Joshi *et al.* and 0% by Phalke *et al.* [9,10]. Recording and mentioning of weight of the patient are crucial step in prescription writing because the dose calculation of the drugs is based on it. Without knowledge of weight of the patient, there are always chances of under-dosage or over-dosage of the drugs.

It was found in our study that on an average 3.25 ± 0.24 drugs were prescribed per prescription, while it was 3.1 in a study by Potharaju and Kabra, 3.73 in a study by Nguyen *et al.*, and 5.1 in a study by Khade *et al.* [11-13]. Polypharmacy (≥ 5 drugs in one prescription) was found in 7.87% of the prescriptions in our study. This is in contrast to the findings of Biswas *et al.*, who found in their study that 21.24% of the prescriptions showed polypharmacy [14]. It is a major concern in the present scenario because it leads not only to unwanted drug-drug interactions but also leads to rapid development of antibiotic resistance.

In our study, 64.1% drugs were found to be prescribed by brand names, whereas in studies by Saini *et al.*, Biswas *et al.*, Joshi *et al.*, and Datta *et al.*, the percentages of drugs prescribed by brand names were 37%, 35%, 97.03%, and 100%, respectively [6,9,14,15]. These values are quite higher as per standards recommended by WHO and MCI,

which state that 100% of the drugs should be prescribed by generic names [4,5].

In our study, the tablet was found out to be the most commonly prescribed dosage form (69.14%). In a study by Biswas *et al.*, the maximum number of drugs prescribed was in the form of eye drops (76%) [14]. In our study, we also noted that only 0.04% of the drugs were prescribed without mentioning their dosage form. This value is much better than the values obtained by Joshi *et al.* and Al Shahaibi *et al.* which were 21.85% and 23%, respectively [9,16]. We found that only 1.51% of the prescribed drugs in our study were injections. Overall, in 1.85% of the prescriptions, injections were prescribed. This value is also in concordance with recommended values for the WHO prescribing indicators, according to which percentage of injections prescribed should be <20% [4].

About 53.90% of the drugs in our study were prescribed without mentioning the dose of the drug. In their study, Al Shahaibi *et al.* observed that 22% of the prescriptions did not have information regarding the dose of the drug [16].

In our study, we observed that route of administration was not mentioned for 86.08% drugs. The finding that route of administration has not been mentioned for majority of the drugs is probably due to the fact that with oral dosage forms such as tablets, capsules, and syrups, the prescribers take it for granted that such dosage forms are meant to be taken orally only. In a study by Joshi *et al.*, it was found that route of administration was not mentioned for 21.85% of the drugs [9]. In Phalke *et al.*'s study, in 24.8% prescriptions, route of administration was not mentioned [10].

For 10.63% of drugs, the frequency of administration was not mentioned. Our results are much better than the results obtained by Joshi *et al.*, who found that for 22.44% drugs, the frequency of administration was not mentioned [9]. It was observed in our study that specific instructions for administration of the medicines were given for 26.34% drugs, while in Joshi *et al.*'s study, none of the prescriptions contained any such instructions [9]. The total duration of treatment was mentioned in only 63.94% of the prescriptions of our study as compared to 72.92% drugs in Joshi *et al.*'s study [9].

We found that drug class duplication was seen to be present in 17.68% prescriptions. This is comparable to the results in the study by Rathish *et al.* who found 14.65% of prescriptions containing drug class duplication [7]. One or more FDCs were prescribed in 46.27%

prescriptions in our study, while the overall percentage of FDCs from the total number of drugs was 17.36%. In a study by Singh *et al.*, 26.07% of the prescriptions were found to contain FDCs [17].

In our study, 76.36% of the prescribed drugs were from the NLEM, which is arguably a good percentage of drugs, but still falls short of the WHO optimal value (100%) [4]. In Saini *et al.*'s study, percentage of drugs that were prescribed from NLEM was 89.96% [6]. Out of the total prescribed drugs, only 64.63% were available at hospital pharmacies. Antacids were found to be the most commonly prescribed drugs (24.27%). The percentage of antacids out of all prescribed drugs was found to be 11.46% by Saurabh *et al.*, 12 % by Al Shahaibi *et al.*, and 16.8% by Khade *et al.* [13,15,18]. About 48.21% of all the prescriptions contained one or more antibiotics, which is more than the WHO optimal value (<30%) [4]. This finding is important because antibiotic resistance arises from indiscriminate use of antibiotics.

In our study, we found that the name of the prescribing doctor was mentioned in 1.95% prescriptions only. While in a study by Phalke *et al.*, the name was found to be written on 76.7% of the prescriptions, which is much better results as compared to our study [10]. In our study and a study conducted by Shelat and Kumbar, the registration number (from the State Medical Council or the MCI) was not mentioned in any of the prescriptions [19]. However, Rathish *et al.* who conducted their study in Sri Lanka found that the registration number of the doctor was written in 35% of the prescriptions [7]. In our study, signatures of the doctor were present in 89.32% of the prescriptions. Phalke *et al.* observed that in 88% of the prescriptions, prescriber's signatures were present [10]. The incompleteness of the doctor related information not only raises a question over the authenticity of the prescription but also raises a question over the tendency of the doctors to adhere to MCI guidelines [5]. Only few prescriptions of our study showed stamp of the prescribing doctor (4.13%) and specialty of doctor (49.37%).

CONCLUSION

The study revealed that many prescriptions lacked crucial components of information pertaining to the patient (like diagnosis), pertaining to drugs prescribed (especially dose, route, and duration), and pertaining to the prescriber (such as name and signature). There is a vast scope for improvement by the prescribers. Apart from these, prescribing drugs by generic names and in capital letters needs to be encouraged while use of abbreviations needs to be discouraged.

AUTHORS' CONTRIBUTIONS

The study was designed and conceptualized by Dr. Kamaldeep Singh and Dr. Garima Bhutani. Literature search, data acquisition, data analysis, and manuscript preparation were also done by them. Dr. Seema Rani, Dr. Rahul Saini, and Dr. Arvind Narwat helped in data analysis, manuscript preparation, manuscript editing, and manuscript review.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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