

Assessment of Legibility and Prescription Writing Practices by Undergraduate Medical Students

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ABSTRACT

Prescription is an official order issued by a qualified practitioner that authorize a sick person to receive a medicine. Clinical outcome of a disease depends upon the nature of drugs prescribed, dispensed by the pharmacist and patient's compliance. Prescription writing is an art learned by medical graduates during their training as medical students. **Objectives:** It was aimed to assess the clinical skill for prescription writing and its evaluation by 3rd year medical students. **Methodology:** This study was conducted at Pharmacology Department, University of Health Sciences Lahore, during August 2021 to January 2022. A convenient nonrandom sampling method was adopted. The students were asked to collect 3 copies of prescriptions from different clinical settings. The collected documents were analyzed during practical classes for omissions of prescriber or patient's biometrics. Moreover, selection of medicines, route, dose and duration was noted. **Results:** There were 400 prescriptions evaluated. The omissions in patients and prescribers were 28% and 18% respectively. The provisional diagnosis was missing in 19%. The illegibility was 13.5%. On average, 3.5 drugs were prescribed per prescription. Analgesics and drugs for peptic diseases were about 24%. There were 15.8% & 14.2% patients taking drugs for infectious diseases and cardiovascular disorders respectively. **Conclusions:** This study confirms the legibility of prescriptions is good. The magnitude of omissions is high. The shortcomings highlighted in this work can be rectified.

Keywords: Compliance, prescription writing, errors, omissions

INTRODUCTION

The primary goal of drug therapy is to cure a disease or improve the quality of patient's life. The prescription is a legal document of communication between a doctor and the dispenser or pharmacist to dispense the drugs. History of prescription is perhaps as old as human beings. First evidence of prescription dates back to 2100 BC in Mesopotamia. ⁽¹⁾ There are two types of prescriptions, extemporaneous and non-extemporaneous. Non-extemporaneous prescription is the general recipe for a disease, while extemporaneous prescription is the treatment aimed for a specific patient written at the spot. ⁽²⁾

The extemporaneous prescription is centered towards a patient's condition, and it must provide proper dose, concentration of the right drug via appropriate route at right time for a specified period. ³ Failure of doctors to properly guide the drug providers with these information may result in therapeutic failure and even worsening of patient's health. An example of this was a case in UK court of appeal, where a doctor prescribed Amoxil (Amoxicillin) but the dispenser gave Daonil (Glibenclamide). The patient suffered from permanent brain damage and 25% responsibility of this error was laid on the doctor. ⁽³⁾ World health organization has framed some basic parameters which a prescription must contain to minimize the risk and ensure compliance. These include name and address of prescriber (with telephone number, if possible), date of prescription, names

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and address of patient, names and strengths of drug, dosage forms, total amount of drugs, information for packaging label and signature of the prescriber. ⁽⁴⁾ The prescription must be legible and duly signed. Apart from these, further details such as maximum daily dose, warnings might also be included as and when needed. Broadly classifying, prescription errors can be of 2 types: Errors of omission and Errors of commission. Errors of omission means that any of the important details regarding dosage, strength or route is missing in the prescription while error of commission means the wrong information is provided in the prescription. ⁽⁵⁾ Some drugs with similar spellings such as metoprolol and metaproterenol have opposite effects. These are known as Look-Alike Sound-Alike drugs (LASA drugs). Such drugs might be confused and can be dispensed as wrong drugs. ⁽⁶⁾ In errors of omission, missing the dose and strength of the drugs are the problems that can be deleterious for patients. Improper dilution of the drug can be the most fatal error, especially in drugs like KCl. Such errors are most commonly found in the ICU settings, and up to 20% of such errors can be life threatening. ⁽⁷⁾ Collectively, medical errors kill approximately 44,000 to 98,000 Americans each year. ^(4,8) In Pakistan nearly half a million people die due to medical errors, which include errors in dose, medicine, and prescription writing. ⁽⁹⁾ Almost half of the prescriptions written in Pakistan are incomplete. ⁽¹⁰⁾

Computerized system of prescription is expected to have lesser errors of omission as well as illegibility. It also helps to keep the record of the drugs already given to the patient and monitor the daily dose and maximum available limit that can be given. However, this system can also have flaws while entering the data and software malfunction. ⁽⁴⁾ Prescription errors are avoidable. Knowledge and attitude of the prescriber are the main factors responsible for these errors. Other factors responsible for prescription errors may include over-worked hospital units, fatigued employees and unsuitable environment. ⁽¹¹⁾ Prescription writing is part of pharmacology curriculum for 3rd year medical students. The problem arising by errors of prescriptions can be dealt modestly if the students are well taught and practiced during their studies. Targeted training of the doctors can help in avoiding such errors. ⁽¹²⁾ Our study was aimed to evaluate/assess the legibility and prescription writing practices by undergraduate medical students.

To objective of the study was

1. To assess knowledge and awareness about errors and various parts of prescriptions among 3rd year medical students.
2. To identify types and frequency of prescription errors in various clinical settings.
3. To evaluate frequently prescribed groups of drugs.

METHODOLOGY

This study was conducted at Pharmacology Department, University of Health Sciences Lahore from August 2021 to January 2022. The research work was approved by Ethical Review Committee of the institute. 3rd year MBBS students of Session 2021-2022 of a government medical college were invited to participate in this study.

It was convenient non-random sampling of four hundred (400) handwritten prescriptions from various clinical settings. Method described by Bates et al., (2010) was adopted with minor changes

and prescriptions were evaluated by 3rd year medical students under the supervision of faculty of Pharmacology Department. ⁽¹³⁾ pre-designed validated proformas relevant to prescribed drugs, doses, routes, prescriber's information, legibility, and patient identifiers were distributed among students via google forms. Frequently prescribed drugs/groups of drugs were also noted by the students. ⁽¹⁴⁾ The data obtained from google forms was analyzed by faculty of Pharmacology Department using SPSS version 20. The numerical figures were presented in simple percentages, mean and standard deviation.

RESULTS

Total 400 prescriptions were collected and evaluated by medical students. Regarding prescription errors, Patient identifiers were missing in the range of 3.8%- 27% of prescriptions. Age and sex of the patient were not mentioned in 20.3% & 27.1% of the prescriptions respectively. However, omission in patients name was only 3.8 %. It was noted that omission in prescriber's information was 18% while omissions in diagnosis was found to be 19% (Fig 1). The inscription part of 38.3% prescriptions did not mention routes of administration. Duration of therapy was missing in 32.3% of all prescriptions (Fig 2). Dosage forms were omitted in 6.8% of all prescriptions, while strength of medications was not mentioned in 24.1% of the prescriptions. Majority prescriptions were readable, but illegibility of prescriptions was calculated to be 13.5%. Signatures were not present in 19.5% of the prescriptions (Table 1, Fig. 2). The number of drugs (3.5 ± 1.42) (Range 1-5) were prescribed on average. Among them, Analgesics, and drugs for peptic disease were the most frequently prescribed drugs (24% & 23.6% respectively) followed by dietary supplements (15.8%), antimicrobials (14.2%) anti hypertensives (11.7%) anti histamines (6.9%) and antidiabetic drugs (3.8%) (Table 2, Fig 3).

Table 1. Omissions in prescriptions issued to the patients (n= 400)

Information related to Prescriber & patient		
	Prescriptions	
	Present (%)	Absent (%)
Doctor's Name, Qualification & Designation	82	18
Patient Name	96.2	3.8
Age	79.7	20.3
Sex	72.9	27.1
Address	75.2	24.8
Date	92.5	7.5
Signature	80.5	19.5
Information related to Drugs Prescribed		
Diagnosis	92	19
Number of drugs (Mean± S.D)	3.5 ±1.42	
Dosage form	93.2	6.8
Strength	75.9	24.1
Route of Administration	61.7	38.3
Duration of therapy	67.7	32.3
Legible Hand writing	86.5	13.5

Where: A component is present=1 and the component of prescription is absent=0

Table 2. Group of drugs prescribed to patients (n=1437)

Prescribed medicines	Percentage (%)
Analgesics	24
Anti peptic ulcer/antiemetics	23.6
Herbal/dietary supplements	15.8
Antimicrobials	14.2
Antihypertensives/antianginals	11.7
Antihistamines	6.9
Antidiabetics	3.8

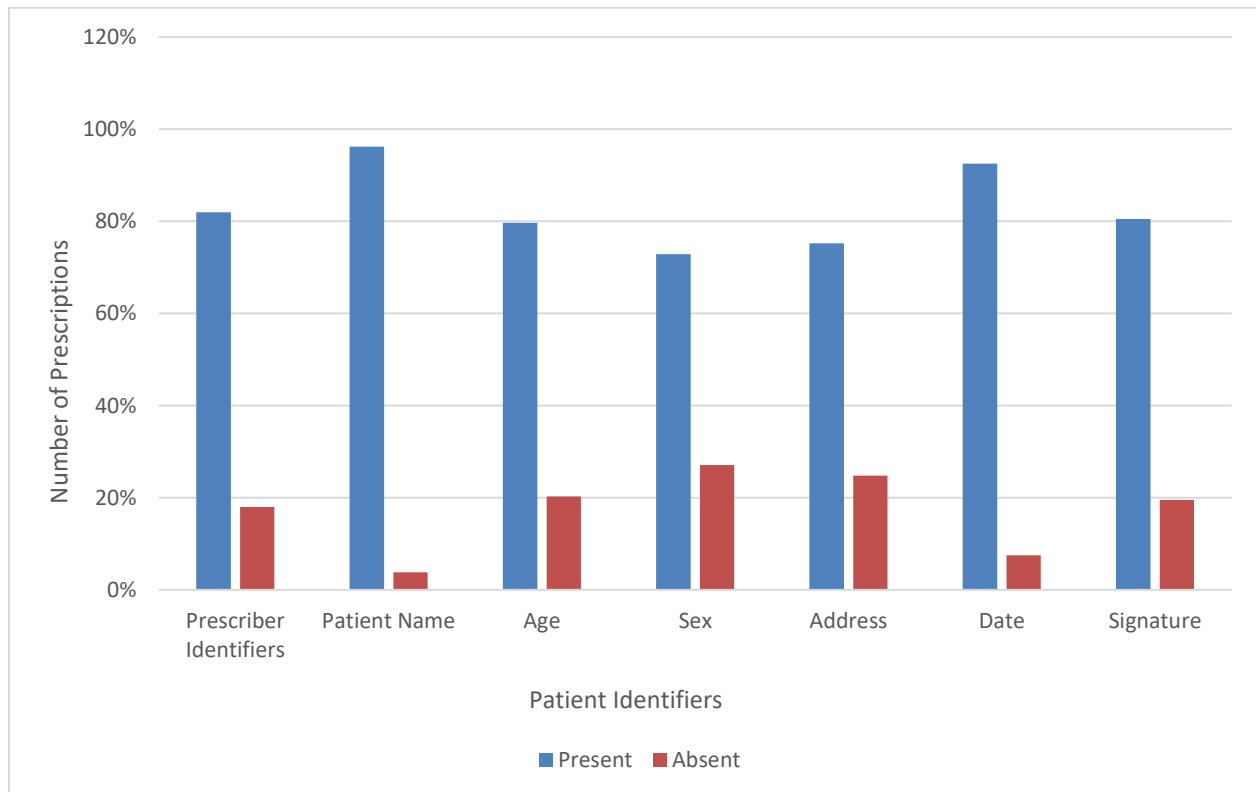


Fig 1. Bar chart showing Omissions in prescriber and patient related information in prescriptions (n=400)

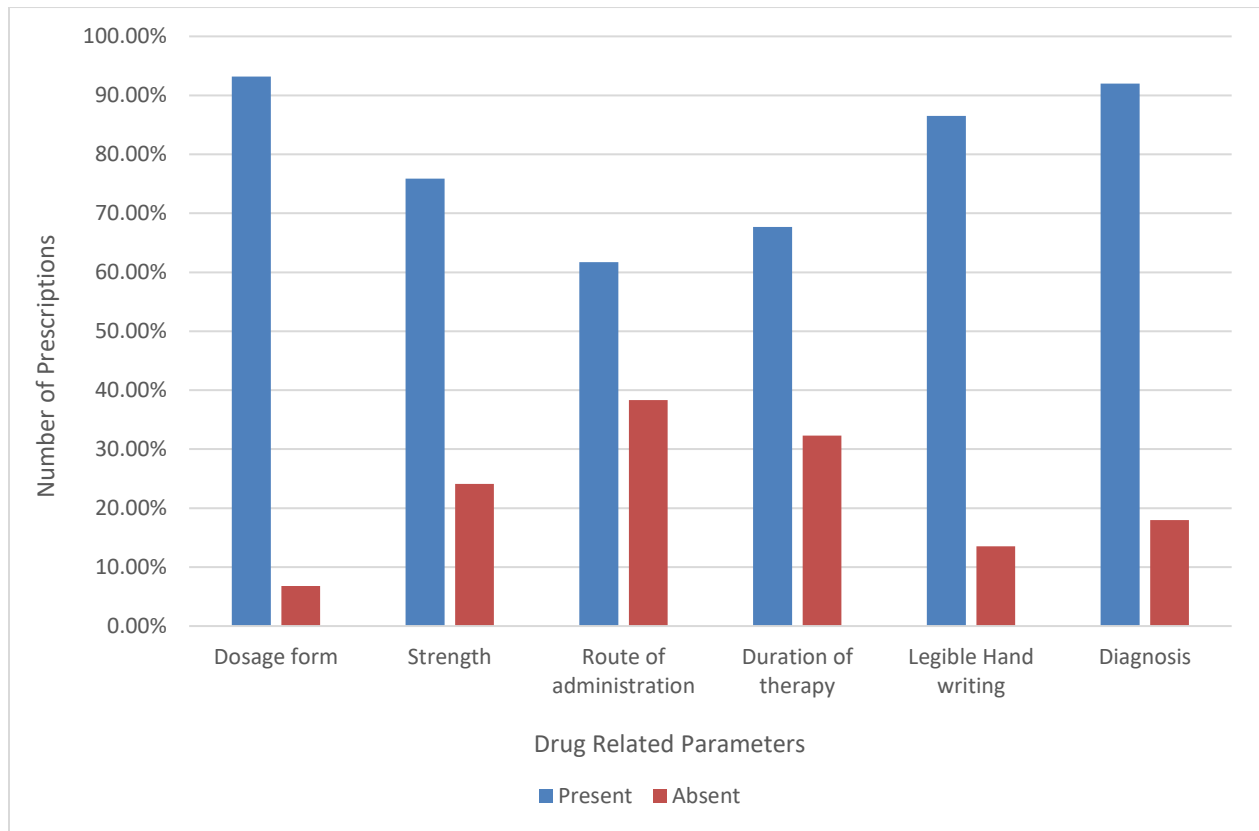


Fig 2. Bar Chart showing omissions in drug related information in prescriptions (n=400)

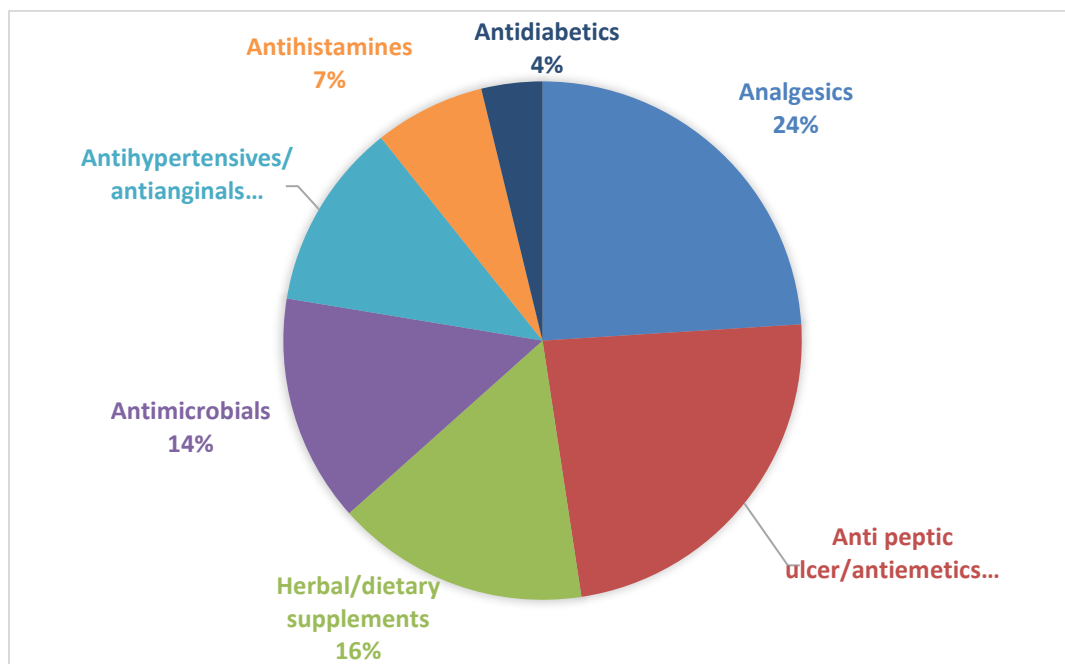


Fig 3. Pie diagram showing frequently prescribed medicines (n=1437)

DISCUSSION

Drugs assume a crucial part in the health care framework. Proper prescription writing is basic to guarantee the better clinical management of the patients. Handwritten prescription writing is still practiced in many countries along with electronic data entry of prescriptions. ⁽¹⁰⁾ Quality of medical care is being evaluated time to time in medical institutes. Regarding Prescription errors, it is stated that "Clinically meaningful prescribing error occurs when there is an unintentional significant reduction in the probability of treatment being timely and effective or increase in the risk of harm when compared with generally accepted practice". ⁽¹⁵⁾ These prescription errors kill approximately 44,000 to 98,000 Americans each year. ^(4, 8) Hence, a standard prescription must be devoid of incomplete and incorrect information about particulars of patient and prescriber as well as drug doses, duration of therapy, drug-drug interactions and routes of drug administration. Present study clearly indicated some deficiencies in the quality of prescription writing. A substantial number of prescriptions (20-30%) were devoid of the age, sex and address of patients. Complete addresses were missing in 24.8% of prescriptions. The gravity of the problem becomes more serious if the name of the patients is also omitted in prescription. These findings are consistent with a study conducted in 2004 by Majeed et al., where age and address of the patients were missing in 29% of assessed prescriptions. ⁽¹⁶⁾

There were 13.5% illegible prescriptions found in this study. Poor legibility leads to dispensing errors by pharmacist due to confusion in reading generic and brand names of medicines. Dosage form omissions were 6.8% and dose of drugs was not mentioned in 24.1 % cases. Improper dosing can cause under or over dosage in patients. This may lead to incorrect adjustment of dose after monitoring plasma concentration of drugs having narrow therapeutic index like anti-arrhythmics, anti-cancers and antimicrobials. Variation in dispensing the same drug having different formulation which can also cause toxic effects due to larger or smaller doses. ⁽¹⁷⁾ Out of 400 prescriptions, routes of drug administration were not mentioned in 38.3% of cases. It has been known as a fact that errors in intended routes of administration can lead to adverse fatal outcomes. Interchange of enteral or parenteral routes of administration can result in severe toxic reactions or even death of the patients. ⁽¹⁸⁾ We found that 19.5% of prescriptions were not signed and stamped. Such blank unauthentic prescriptions are misused and considered illegal. Data collection from multiple rural and urban health care setups may increase the magnitude of prescription errors. This was described by Majeed et al., (2004) where omissions of signatures were found in 26% of prescriptions collected from various cities and towns of Punjab. ⁽¹⁶⁾ Our findings of all four hundred prescriptions revealed that a total of 1437 drugs were prescribed to these patients. The average number of drugs prescribed was (3.5 ± 1.42) . However, in our study, maximum five drugs were prescribed showing competency and good prescription writing skills of prescribers. This is in accordance with a previous study conducted in south Indian private hospital where number of drugs prescribed for each patient ranged from 1 to 7 and (Mean \pm SD) of 2.4 ± 1.1 . ⁽¹⁹⁾ Literature suggests that frequency of error increases with an increasing number of drugs. Poor compliance with long term medications may compromise health care benefits. Our study indicates that most frequently prescribed drugs are NSAIDs, opioids, antiemetics,

antidiarrheals and drugs to treat acid peptic disease. Other important drugs used were antimicrobials and antihypertensives.

The current study was planned to analyze the completeness and legibility of the prescriptions. Result of this research supports the significance of prescription writing skills by physicians in limiting preventable adverse events ascribed to prescription errors. The authors are of the opinion that these efforts will improve quality of healthcare system by decreasing prescription errors. Its findings can help health professionals understand the frequency and types of prescription omissions that occur, as well as the procedures that may be done to prevent these errors for improved patient care and safety. ⁽²⁰⁾ Doctors have a moral duty towards patients as well as to their dispensing colleagues to ensure drugs prescriptions are readily identifiable so there is also a need for medical teachers to further emphasize on the importance of writing clear, concise and complete prescriptions as a part of medical curriculum. ⁽²¹⁾

CONCLUSION

This study confirms that legibility and good writing not only reduce the magnitude of omissions but also improve the patient's safety and quality of health care system. A limitation of this study was failure to collect data from private sector medical institutes which may be planned in future studies.

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