

Original article:

Evaluation of Errors in Prescription Writing: A Cross-Sectional Study at Community Pharmacies and Tertiary Care Hospitals of Lahore, Pakistan.

Muhammad Farhan Ali Khan¹, Muhammad Salman², Nazeer Hussain Khan³, Talha Masood⁴, Muhammad Safdar⁵, Khuzaima Ikhlaq⁶, Muhammad Umair Ansari⁷, Muhammad Shahid Latif⁸, Muhammad Saqlain⁹, Zia Ul Mustafa¹⁰, Noman Asif¹¹

Abstract

Background: Prescription errors often lead to mishaps around healthcare facility that often end up with adverse drug reactions and even some cases death. Being in a healthcare facility the patient should have full confidence in the health care providers and not have to worry about minor mistakes leading to a possible lethal one. **Aim and objective:** The aims and objectives of our study is to evaluate the prescription writing errors in different community pharmacies and tertiary care hospitals also to assess the knowledge of patients regarding their disease and treatment.

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Introduction

Patient safety is a growing concern since November 1999 because of the release of the Institute of Medicine report in which health care experts were astonished to discover that blunders including physician endorsed pharmaceuticals are responsible up to 7000 American casualties for each year with money related medication related dismalness and mortality costing up to \$77 billion a year¹. As time has advanced, this issue has not diminished and it's a persistent developing concern even starting now in 2015. Solution mistakes may leads to wounds and misuse of cash. The National Coordinating Council for Medication Error and Prevention has a working definition for prescription mistake as, "Any preventable occasion that may bring about

or lead to unseemly drug use or patient damage, while the pharmaceutical is in the control of the medicinal services proficient, patient, or shopper. Such occasions might be identified with expert practice, social insurance items, and frameworks including: endorsing, requesting correspondence, item naming, bundling and terminology, intensifying, administering, circulation, organization, training, checking and utilizing." Taking into account this definition, it can be inferred that pharmaceutical mistakes don't generally fundamentally come from specialist's solution yet can be engendered from any social insurance administration given to the patient and can even be the patients blame by and large. Drug errors related patient tragedies has expanded from 198,000 in 1995 to 218,000 in 2000 which

1. Muhammad Farhan Ali Khan, Department of Pharmacy, Quaid-i-Azam University Islamabad Pakistan
2. Muhammad Salman, College of Pharmacy, University of Punjab Lahore Pakistan
3. Nazeer Hussain Khan, Department of Animal Sciences, Quaid-i-Azam University Islamabad Pakistan
4. Talha Masood, College of Pharmacy, University of Punjab Lahore Pakistan
5. Muhammad Safdar, College of Pharmacy, University of Punjab Lahore Pakistan
6. Khuzaima Ikhlaq, College of Pharmacy, University of Punjab Lahore Pakistan
7. Muhammad Umair Ansari, College of Pharmacy, University of Punjab Lahore Pakistan
8. Muhammad Shahid Latif, College of Pharmacy, University of Punjab Lahore Pakistan
9. Muhammad Saqlain, Department of Pharmacy, Quaid-i-Azam University Islamabad Pakistan
10. Zia Ul Mustafa, College of Pharmacy, University of Punjab Lahore Pakistan
11. Noman Asif, College of Pharmacy, University of Punjab Lahore Pakistan

Correspondence to: Muhammad Farhan Ali Khan, Department of Pharmacy, Quaid-i-Azam University Islamabad Pakistan, Email: farhanali6879@gmail.com

prompt US economy expenses of these mistakes to more than \$177 billion every year². Drug blunders are a typical mix-up happening comprehensively around the globe and more pervasive in specific nations than others. The blunders can go from the oversights of specialists, medical attendants, drug specialists and even the patients. Further research demonstrates that wounds because of drug blunders are not only the shortcoming of one individual social insurance supplier but instead, because of the disappointment of an intricate human services framework³. This further supports the definition expressed by The National Coordinating Council for Medication Error and Prevention. The worry isn't simply with grown-up patients yet even youngsters which incorporates babies. In 2000, a gathering of specialists on gaining from antagonistic occasions reported that subsequent to 1985 there were no less than 13 scenes in which kids (for the most part) had been murdered or incapacitated in light of the fact that the wrong organization of medications by spinal rope infusion, 12 required in vinca alkaloids, and 10 were deadly⁴. This examination demonstrates

Table 1: Literature Review

Author	Country	Year	Sample size	Design	Findings
Bates et al. [5]	USA	1995	379 patients	Cohort study	Medication errors are common, although relatively few results in ADEs that could be prevented via electronic prescription orders by physicians.
Barker et al. [7]	USA	2002	3216 doses	A prospective cohort study	Medication errors were common (nearly 1 of every 5 doses in the typical hospital and skilled nursing facility). The percentage of errors rated potentially harmful was 7%, or more than 40 per day in a typical 300-patient facility
Phillips et al. [8]	USA	2001	5366	Prospective	469 fatal medication error reports, 48.6% occurred in patients over 60 years. Improper dose (40.9%) wrong drug (16%) wrong route(9.5%)
Dean et al. [9]	UK	2002	36200	Prospective study	135 prescribing errors identified each week, of which 34 were potentially serious
Ross et al.[10]	UK.	2000	195 areas	Retrospective	The overall medication error rate was low. Medication errors occurred in 0.15% of admissions While the highest rate occurred in neonatal intensive care (0.98%), A total of 195 errors were reported over a 65 month period

a lot of worry as treatment may end with death for the youngsters or may even devastate their lives creating additional agony and misfortune to both the patient and close family. It is asserted that around 1 to 10% of drug blunders are connected with patient damage⁵. Besides, poor written work of medicines prompts error of medication measurement or medication organization timings⁶. Then again, the rate of restorative blunders all through the world is high to the point that is represented one of the five noteworthy reasons for casualties.

Materials and Methods

Materials

To assess the likely impacts of prescription errors on patients regarding their disease and treatment, a literature search was undertaken using Web of Science and Google Scholar as data bank. Following chapters includes the literature review of various research article related to the medication errors associated with prescribing patterns support this work.

The literature survey is described in the following Table 1.

Table 1: Literature Review(continued)

Author	Country	Year	Sample size	Design	Findings
Schwartz et al. [11]	USA	1962	178 elderly patients	Prospective study	In 178 patients, averaged 1.5 errors per prescription. And major reason is inaccurate knowledge followed by errors in self-medication.
Coombes et al. [12]	Australia	2008	14 prescribers	prospective study	Lack of drug knowledge was not the single causative factor in any incident
Calligaris et al. [13]	Italy	2009	756 inpatients	Prospective	Overall 23.9% of prescriptions were illegible and 29.9% of prescriptions were incomplete. Legibility and completeness are higher in unusual drugs prescriptions. The survey confirms the extensive use of antibiotics in an acute care hospital.
Morimoto et al. [14]	USA	2004	27617 patients	Prospective Cohort	To reduce the likelihood of harm related to medications

Research Instruments

A 33-item questionnaire was used to assess patient’s knowledge (provided by health care professional) regarding their disease/illness and its treatment, and prescription errors made by the prescriber. This questionnaire was designed by the researchers after extensive literature review comprising Section A which had 9 questions to obtain general characteristics of study participants. Section B had 8 questions to assess patient’s knowledge (given by health care provider) about their ailment and its treatment. Section C had 16 questions to evaluate the prescription errors made by the prescriber. The questionnaire was thoroughly reviewed by two lecturers of Clinical Pharmacy at University College of Pharmacy, University of the Punjab, Lahore, Pakistan. Based on the recommendation of the reviewers, amendments were made with regard to arrangement and structure of questions.

Statistical analysis

Continuous variables were presented as mean and standard deviation (SD) while categorical variables will be expressed in numbers or percentages. All statistical analysis were performed using SPSS version 21.0 (SPSS Inc., Chicago, IL) for Windows.

Method

A cross-sectional study was conducted in six community pharmacies and two tertiary care hospitals namely Mayo hospital and Jinnah hospital, Lahore, Pakistan.

Sampling procedure

A convenient sampling technique was used to enroll all the eligible patients who met the inclusion criteria and gave consent to participate in the study.

Inclusion criteria

Inclusion criteria of patients for the present study are as follows:

- Male or female patients above age 40 years
- Patients visiting the aforementioned study settings

Exclusion criteria

- Patients visiting pharmacies to purchase things other than medicine.
- Patients age < 40 years

Data collection period

Data collection period for the current study was 3 months (1st February to 30th April 2016)

Ethical approval

Permission to conduct this study was obtained from College of Pharmacy, University of Punjab Lahore Pakistan.

Results

A total of 560 prescriptions were included in current study. Characteristics of study sample are given in Table 2. There was a predominance of male belonging to 40-49 years of age group. Majority of prescription were from private hospitals and clinics. We found out that 60.4% prescriptions were from private hospitals and clinics and 39.6% of prescriptions were from Govt. Hospitals. Most of the doctors prescribed drugs with brand names.

Table 2: Demographics of the study cohort

Characteristics	N	%
Gender		
Male	310	55.4
Female	250	44.6
Age		
40-49	281	50.2
50-59	183	32.7
60-69	71	12.7
≥ 70	25	4.5
Occupation		
Self-employed	159	28.4
Salary worker	113	20.2
Un-employed	288	51.4
Residence		
Urban	413	73.8
Rural	147	26.3
Prescription type		
Hand written	535	95.5
Electronic	7	1.3
Printed	18	3.2
Legibility of prescription		
Legible	434	77.5
illegible	126	22.5
Prescription is from		
Govt. hospital	222	39.6
Private hospital/clinics	338	60.4

Table 2: Demographics of the study cohort (continued)

Characteristics	N	%
Prescribed drugs belong to		
Local manufacturer	206	36.8
Multi-national company	354	63.2
Prescribed drugs are written as		
Brand name	554	98.9
Generic name	6	1.1

Knowledge of patients regarding their treatment and side effects are shown in table 3. We observed that majority of patient were not given proper information about side effects of drugs. Mostly patients knew about their medication. Maximum numbers of patient were properly counseled about their dose, timing and frequency of their medication.

Table 3: Knowledge of patients regarding their disease and treatment

Response	N (%)
Did you receive information about your disease?	
Yes	457 (81.6)
No	103 (18.4)
I don't know	--
Did you receive information about your medication?	
Yes	331 (59.1)
No	229 (40.9)
I don't know	--
Did you receive information about your treatment?	
Yes	350 (62.5)
No	210 (37.5)
I don't know	--
Doyou know which activities are allowed at home?	
Yes	206 (36.8)
No	354 (63.2)
I don't know	--
Doyou know about the side effects of medications you are currently on?	
Yes	171 (30.5)
No	389 (69.5)
I don't know	--
Doyou know when to contact your health care provider?	
Yes	204 (36.4)
No	356 (63.6)
I don't know	--
Do you know about correct dose, timing and frequency of your medication?	
Yes	393 (70.2)
No	167 (29.8)
I don't know	--
Can you reach yourdoctor/ pharmacist for medication-related problems?	
Yes	261 (46.6)
No	299 (53.4)
I don't know	--

Knowledge of patients regarding their disease and its treatment was assessed by giving 1 to right answer (yes) and 0 to wrong answer (no and I don't know). The scale measured knowledge from maximum 8 to minimum 0, with high score indicating good knowledge. The mean knowledge score of study cohort was 4.21 ± 2.14 .

Major focus of our study was on prescription errors which are shown in the study sample of table 4. There was very alarming situation that most of prescriber (69.5%) did not give instruction to pharmacist. Only 62.9% of prescriptions had signature of prescriber on it. We noticed that an average of 6.34 errors per prescription.

Table 4: Prescription errors in the study sample

Responses	N (%)
Prescriber’s information	
Present	429 (76.6)
Absent	131 (23.4)
Patient’s information	
Present	365 (65.2)
Absent	195 (34.8)
Date written on prescription	
Present	501 (89.5)
Absent	59 (10.5)
Superscription	
Present	389 (69.5)
Absent	171 (30.5)
Inscription	
Present	463 (82.7)
Absent	97 (17.3)
Subscription	
Present	220 (39.3)
Absent	340 (60.7)
Signa	
Present	240 (42.9)
Absent	320 (57.1)
Prescriber’s signature	
Present	352 (62.9)
Absent	208 (37.1)
Dosage form:	
Mentioned	533 (95.2)
Not mentioned	27(4.8)
Dose :	
Mentioned	493 (88.0)
Not mentioned	67 (12.0)
Concentration:	
Mentioned	264 (47.1)
Not mentioned	296 (52.9)

Table 4: Prescription errors in the study sample (Continued)

Response	N (%)
Route of administration:	
Mentioned	284 (50.7)
Not mentioned	276 (49.3)
Rate of administration:	
Mentioned	166 (29.6)
Not mentioned	394 (70.4)
Time of administration:	
Mentioned	388 (69.3)
Not mentioned	172 (30.7)
Frequency of administration	
Mentioned	263 (47.0)
Not mentioned	297 (53.0)
Re-fill	
Mentioned	46 (8.2)
Not mentioned	514 (91.8)

Number of errors per prescription was assessed by giving 1 to incorrect prescription writing practice and 0 to correct. The scale identified errors ranges from minimum 0 to maximum 16. The mean number of errors identified in the study cohort was 6.36 ± 2.84 .

Discussion

The main findings of our study revealed that current practice of prescription writing is not of appropriate standards. We found several errors in prescription writing. Prescription parameters such as patient name, address, date, Rx, inscription, subscription, signa and prescriber’s signature are parts of prescription. Most common errors were associated with the parts of prescription including absence of, “subscription” which is the instruction of prescriber to the pharmacist and, “signa” which is directions of physician to the patient about medication use and care plan. Besides the errors of parts of prescription another interesting thing, was the information about the dosage regimen i.e. dose, dosage form, frequency, route of administration and duration of course etc. the clinicians are very much conscious and clear in mentioning about all these aspects of dosage regimen. This depicts the rational prescribing of clinicians in current scenario of our community. We also assessed the information delivered to the patient by the health care provider. Although the information about disease, treatment and medication was given to the patient but side effects and/or adverse effects

associated with the medication and who to contact in emergency situations, were not properly addressed. Contrary to the findings of an earlier study¹¹, we found an average 5 times more error per prescription. The probable reason for this high rate could be inappropriate behavior of the prescriber, illegible hand writing and less use of modern ways e.g. printed prescription. This can also be attributable to not following the international standards of prescription writing. The less number of errors in prescription writing in the previous study¹¹ was mainly due to the harmonization with the standards and compulsion by the law and enforcement by the health organizations. Our findings regarding the prescription legibility and incompleteness of medication orders are comparable to the results of a previous study¹³. The reason behind the excessive errors was the unreadable hand writing of the prescribers which can lead to the dispensing of the look-alike sound alike (LASA) drugs. Only the electronic advancement can improve this highlighted issue and remove the hurdles towards the rational prescribing.

We did not use a probability sampling method e.g. random sampling, and therefore we had disadvantages such as selection biasness. There can also be selective biasness for study settings. Also we had a concise sample size. We did not include medical stores in our investigation where the selling of non-prescription drugs is excessive as there is no pharmacist present.

Our findings highlight the need of computer aided programs and software which can monitor the prescriptions and minimize drug interactions, adverse drug reactions and medication order related errors.

In current situation there should be a check and balance system that can efficiently work and reduce such errors. Health care provider should organize seminars and orientations for general practitioners and clinicians to keep them in the loop about the current international practices of prescription writing.

Conclusion

Errors in prescription writing are frequent in both public and private hospitals/clinics. There is not a single effective way of reducing these errors instead multiple approaches need to be enforced to bring about near perfect health care practice such as theoretical and practical teaching coupled with frequent assessment of knowledge and skills acquired by new training students and employing electronic prescriptions.

Conflict of Interest

The Authors have no competing interest exist.

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Authors' Contribution:

Data gathering and idea owner of this study: Khan MFA, Salman M, Khan NH,

Study design: Khan MFA, Salman M, Khan NH, Masood T, Safdar M,

Data gathering: Khan MFA, Ikhtlaq K, Ansari MU, Latif MS,

Writing and submitting manuscript: Khan MFA, Salman M, Saqlain M

Editing and approval of final draft: Khan MFA, Salman M, Khan NH, Masood T,

References:

1. Grissinger, M.C., N.J. Globus, and M.P. Fricker, *The role of managed care pharmacy in reducing medication errors*. Journal of Managed Care Pharmacy, 2003. **9**(1): p. 62-65.
2. Grissinger, M., *Medication Errors*. P AND T, 2005. **30**(10): p. 540.
3. Leape, L.L., et al., *Systems analysis of adverse drug events*. Jama, 1995. **274**(1): p. 35-43.
4. Woods, K., *The prevention of intrathecal medication errors: a report to the chief medical officer*. 2001: Department of Health London.
5. Bates, D.W., et al., *Relationship between medication errors and adverse drug events*. Journal of general internal medicine, 1995. **10**(4): p. 199-205.
6. Katzung, B.G., S.B. Masters, and A.J. Trevor, *Basic and Clinical Pharmacology 12/E Inkling (ENHANCED EBOOK)*. 2012: McGraw Hill Professional.
7. Barker, K.N., et al., *Medication errors observed in 36 health care facilities*. Archives of internal medicine, 2002. **162**(16): p. 1897-1903.
8. Phillips, J., et al., *Retrospective analysis of mortalities associated with medication errors*. American Journal of Health-System Pharmacy, 2001. **58**(19): p. 1835-1841.
9. Dean, B., et al., *Prescribing errors in hospital inpatients: their incidence and clinical significance*. Quality and Safety in Health Care, 2002. **11**(4): p. 340-344.
10. Ross, L., J. Wallace, and J. Paton, *Medication errors in a paediatric teaching hospital in the UK: five years operational experience*. Archives of disease in childhood, 2000. **83**(6): p. 492-497.
11. Schwartz, D., et al., *Medication errors made by elderly, chronically ill patients*. American Journal of Public Health and the Nations Health, 1962. **52**(12): p. 2018-2029.
12. Coombes, I.D., et al., *Why do interns make prescribing errors? A qualitative study*. Medical Journal of Australia, 2008. **188**(2): p. 89.
13. Calligaris, L., et al., *Errors and omissions in hospital prescriptions: a survey of prescription writing in a hospital*. BMC Pharmacology and Toxicology, 2009. **9**(1): p. 9.
14. Morimoto, T., et al., *Adverse drug events and medication errors: detection and classification methods*. Quality and safety in health care, 2004. **13**(4): p. 306-314.