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Original Research Article

Assessment of medication prescription errors and their contributory factors in major cities of Punjab Province, Pakistan: A cross-sectional survey

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Abstract

Purpose: *To evaluate the prescription errors and their contributory factors in Punjab, Pakistan.*
Methods: *An observational, cross-sectional study was conducted in 12 major cities of Punjab, Pakistan. A total of 1,184 prescriptions were collected from patients using a convenient sampling method from homes, pharmacies, clinics, and hospitals. The data were presented in frequency and percentage using descriptive statistics. To determine the association between the variables assessed, Chi-square (□2) test was used.*
Results: *A total of 1,184 prescriptions were analyzed; 432 of them (36.5 %) were from prescribers who are graduate degree holders, and 752 (63.5 %) from prescribers who are post-graduate degree holders. The most commonly missing parameters in the prescriptions were the age of the patients (835 representing 29.4 %), signatures of the prescribers (755 representing 26.5 %), and prefix (622 representing 21.9 %). The number of prescription errors was significantly correlated to prescriber qualification (p = 0.001). The prescription errors were more common in age groups of prescribers: 21 - 30 years (654 representing 23.0 %), and 31 - 40 years (1,012 representing 35.6 %) (p = 0.001). The higher number of prescription errors by post-graduate prescribers working in teaching hospitals can be attributed to the higher patient load and lack of continuing medical education programs for the prescribers.*
Conclusion: *The government should take necessary measures for the implementation of electronic prescribing systems, and devise mechanisms for the uniform distribution of patient load amongst the prescribers working in different hospitals.*

Keywords: *Prescription error, Prescribers, Patient load, Continuing medical education, Electronic prescribing*

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INTRODUCTION

Prescription writing is a science and art which provides information regarding medication use to the patient, and it is the responsibility of the prescriber [1]. A prescription is a signed medical order which has the instructions to the pharmacist by the prescriber on how to supply the prescribed drugs to the specific patients. It is a medico-legal document that is written completely, precisely, and legally [2]. The core components of a prescription are prescriber information, patient information, date, superscription, inscription, subscription, signature, and prescriber signature [3,4].

A prescription error is a failure in the prescription writing or filling process which leads to a wrong instruction about one or more components of the prescription [5]. The most common prescription errors encountered during prescription writing are errors of omission and commission [2]. The error of omission represents incomplete prescriptions like missing patient information, incomplete instruction regarding dosage, dosage form, and illegible prescription (difficult to read because of bad handwriting). The error of commission comprises wrong information regarding the drug or patient, which includes wrong drug, wrong route, dosage form or strength [6,7].

Prescription is an integral and vital component for the provision of health. According to the National Coordinating Council for Medication Error Reporting and Prevention, about 0.1 million people die every year as a result of medication errors [6]. World Health Organization (WHO) stated that each year in Pakistan, about 0.5 million people die due to medication errors, and this number can reach 10 million by the year 2050 [7].

It has been seen that there is a gap in the incidence and reporting of prescription errors in developed countries, as only 25% of the prescription errors were reported [8]. Since Pakistan is a developing country and there is no legal reporting mechanism for the incidence of prescription errors in the retail pharmacies, the situation here can be very alarming [9]. Therefore, the studies that can identify the incidence of prescription errors can be very useful in developing policies and frameworks for the prevention of prescription-related medication errors [10].

The aim of the study was to evaluate the prescription errors and the factors that contribute to it in the most populous province in Pakistan.

METHODS

Study design and data collection

An observation based cross-sectional study was performed in 12 major cities in Punjab, Pakistan. Ethical approval was granted by the ethical committee of Department of Pharmacy Practice, Faculty of Pharmacy, Bahauddin Zakariya University, Multan, Pakistan. A total of 1,184 prescriptions were collected from patients using a convenient sampling method from homes, pharmacies, clinics, and hospitals. The prescribers were grouped into two categories based on their qualification as graduate and post-graduate (Table 1).

Prescriptions were evaluated by comparing the written prescriptions with international guidelines/standards of WHO which includes patient data on age, gender and therapy-related information like drug strength, prefix, date of prescription, dose, duration of therapy and the signature of physician [3].

Inclusion/exclusion criteria

Only handwritten prescriptions were collected and not more than one prescription was taken from each patient. Both male and female patients of all age groups were included in the study.

Table 1: Prescriber groups and their qualification

Prescriber's group	Qualification
Graduate	Bachelor of Medicine and Bachelor of Surgery (MBBS)
Postgraduate	Fellow of the College of Physicians and Surgeons (FCPS) Member of the College of Physicians and Surgeons (MCPS)

Statistical analysis

Statistical Package for Social Sciences (SPSS, IBM Corp. Armonk, NY) was used for Statistical analysis. To summarize the data, descriptive statistics were used. For the categorical variables, the chi-square (χ^2) test was used to investigate the association between the variables, and $p < 0.05$ was stated as statistically significant.

RESULTS

Among the total 1,184 prescriptions, 562 (47.5 %) were male, and 622 (52.5 %) were female. The mean age of the patient was 19.9±28.6. The total number of prescribers was 1,172, among which 432 (36.5 %) are graduate degree holders,

and 752 (63.5 %) are post-graduate degree holders. The most common missing parameters were age (835 representing 29.4 %), signature (755 representing 26.5 %), and prefix (622 representing 21.9 %), as shown in Table 2. The frequency and percentage of collected prescriptions from different cities can be seen in Table 3. The number of identified prescription errors was higher in prescribers with post-graduate qualifications (1,876 representing 66 %), than prescribers with graduate qualifications (933 representing 33.9 %). The number of prescription errors was significantly related to the prescriber qualification (p = 0.001). Among hospitals, a higher number of prescription errors were seen in teaching hospitals (1,472 representing 51.1 %), followed by district headquarter hospitals (934 representing 32.8 %), and private hospitals (433 representing 15.2 %) (p= 0.27). The number of prescription errors in male and female were 1,216 (42.8 %) and 1,623 (57.1 %) respectively. There was no significant difference among the gender of the patients (p=0.09). The prescription errors were more common in age groups of 21-30 years (654 representing 23.0 %), and 31-40 years (1,012 representing 35.6 %) (p =0.001) (Table 4).

DISCUSSION

In the current study, 1,184 prescriptions were collected from different cities in Punjab, Pakistan and the total number of prescription errors was 2,839. The most common missing parameters were, age (835 representing 29.4 %), signature (755 representing 26.6 %), and prefix (622 representing 21.9 %). Prescription errors were more common in postgraduate prescribers (1,876 representing 66.1 %), as compared to graduate prescribers (933 representing 33.9 %). Most of the prescription errors were within the age group of 21-30 years (654 representing 23.0 %) and 31-40 years (1,012 representing 35.6 %).

The frequency of prescription errors in the current study was 2,839 (41.7 %), which was lower than reported in UK (77.4 %) [12], and Sri Lanka (91 %) [13].

Table 2: Frequency of different missing parameters (n = 2,839)

Parameter	N	Percent
Age	835	29.4
Gender	104	3.6
Strength	300	3.6
Signature	755	26.5
Prefix	622	21.9
Address	164	5.7
Date	19	0.6

Table 3: Frequency of prescriptions collected from different Pakistani cities (n =1,184)

City	N	Percent
Burewla	96	8.1
Khanewal	97	8.2
Okara	97	8.2
Layyah	97	8.2
Muzaffargarh	97	8.2
Sahiwal	98	8.3
Pakpattan	96	8.1
Gujranwala	110	9.3
Faisalabad	96	8.1
Lahore	102	8.6
Multan	102	8.6
DG Khan	96	8.1

Table 4: Association of prescription errors with different variables

Variable	N (%)	≥ 1 Prescription error, N (%)	*P*-value
Prescriber qualification (n=1172)		2839 (41.7)	
Graduate	432 (36.5)	963 (33.9)	0.001
Post-graduate	752 (63.5)	1876 (66.0)	
Hospital (n=1156)			
Teaching hospital	472 (39.9)	1472 (51.1)	
District Headquarter Hospital (DHQ)	329 (27.8)	934 (32.8)	0.27
Private	355 (30.0)	433 (15.2)	
Gender of patients (n=1184)			
Male	562 (47.5)	1216 (42.8)	0.09
Female	622 (52)	1623 (57.1)	
Age group (y) of the patient			
1-10	65 (5.5)	123 (4.3)	
11-20	97 (8.2)	196 (6.9)	
21-30	180 (15.2)	654 (23.0)	0.001
31-40	260 (22.0)	1012 (35.6)	
41-50	144 (12.2)	536 (18.8)	
51-60	34 (2.9)	104 (3.6)	
61-71	27 (2.3)	76 (2.6)	

The age of the patient was missing in 29.4 % of the prescriptions. This was comparable with reported studies in hospitals of Italy (34.2 %) [11] and Indonesia (31 %) [14]. The signature on the prescription expresses the legality of the prescription [15]. In the current study, 26.5% of the prescriptions were not signed by the prescribers. This is lower than the number reported in Saudi Arabia (41.7 %) [16]. Our study highlighted that the frequency of prescription errors were most common in the age group of 30-40 years of age (1,012 representing 35.36 %), followed by the age group of 21-30 years (23.0 %), and the age group of 41-50 years (18.8 %). These results were consistent with a study conducted in Spain, where the prescription errors in the adolescent age were 31.7 % [17].

The present study revealed that the incidence of prescription errors was more common in teaching hospitals (472 representing 39.9 %), as compared to DHQs (329 representing 27.8 %), and private hospitals (355 representing 30.0 %). These findings were consistent with the reported studies from Malaysia, Oman, and Turkey [18,19]. This high frequency of prescription errors in teaching hospitals may be due to patient burden and non-uniformity of patient distribution.

The frequency of prescription errors was higher in the prescriber group with higher qualifications (p = 0.001), which was consistent with the reported study from Malaysia (p = 0.008) [20]. The greater frequency of prescription errors in prescribers with higher qualifications may be due to a higher patient load and non-uniform distribution of patients. According to the Pakistan Bureau of Statistics, the total population of Pakistan is 220 million, and the number of doctors registered with Pakistan Medical Council is 1.1 million, which shows that doctor to population ratio is 1:1764. This ratio is too high, compared to the World Health Organization standard ratio, that is, 1: 1,000.

Limitations of the study

In the presented study, the prescription was collected from urban areas, and hence prescription errors may be different in rural areas which were not included in the study. Moreover, most of the prescriptions were from people of adult age; in prescriptions for older age groups, the incidence of errors may be different.

CONCLUSION AND RECOMMENDATIONS

The findings of this study reveal that there is a higher degree of prescription errors in the most populous province of Pakistan (Punjab). The major reason for the passing of these prescription errors from prescribers to the patients may be linked to the absence of pharmacists in community pharmacies. The role of pharmacists should be incorporated to overcome these problems in the health care system of Pakistan. The government should take the necessary measures to facilitate the implementation of electronic prescribing and Computerized Physician Order Entry (CPOE), along with the Clinical Decision Support System (CDSS). The professional medical associations should start mandatory Continuing Medical Education (CME) programs for prescribers. Health Administration authorities should devise mechanisms for the uniform distribution of patient load amongst prescribers working in different hospitals.

DECLARATIONS

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Conflict of interest

No conflict of interest is associated with this work.

Contribution of authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

REFERENCES

1. *Kumari R, Idris M, Bhushan V, Khanna A, Agrawal M, and Singh SK. Assessment of prescription pattern at the*

public health facilities of Lucknow district. Indian J. Pharmacol. 2008; 40(6): 243-247.

2. *Ajoke AB and Christiana EU. Study of completeness of prescriptions in paediatrics emergency section of a tertiary hospital in Lagos. Nigeria. J. Appl. Pharm 2013; 3(5): 75-79.*
3. *World Health Organization. Guide to Good Prescribing- A Practical Manual. 1994: 115-142.*
4. *Hussain A, Ibrahim MI and Baber ZD. Compliance with legal requirements at community pharmacies: a cross sectional study from Pakistan. Int J Pharm Pract. 2012; 20(3): 183-190.*
5. *Dean B, Schachter M, Vincent C and Barber N. Causes of prescribing errors in hospital inpatients: a prospective study. The Lancet. 2002; 359(9315): 1373-1378.*
6. *Bates DW. Preventing medication errors: a summary. Am. J. Health-Syst. Pharm. 2007; 64(14_Supplement_9): 53-59*
7. *Ali M, Abbasi BH, Ahmad N, Fazal H, Khan J, and Ali S.S. Over-the-counter medicines in Pakistan: misuse and overuse. The Lancet, 2020; 395(10218): 1373-1378.*
8. *Davis L and Drogasch M. Triple check procedure prevents chemotherapy errors. Oncol Nurs Forum. 1997; 24(4): 641-2.*
9. *Atif M, Azeem M, Sarwar MR, Malik I, Ahmad W, Hassan F, Rehman A, and Rana M. Evaluation of prescription errors and prescribing indicators in the private practices in Bahawalpur, Pakistan. J Chin Med Assoc. 2018; 81(5): 444-449.*
10. *Mahmood KT, Amin F, Tahir M, and Haq I.U. Pharmacovigilance-a need for best patient care in Pakistan. A review. J. Pharm. Sci. Res., 2011; 3(11): 1566-1584.*
11. *Velo GP and Minuz P. Medication errors: prescribing faults and prescription errors. Br J Clin Pharmacol. 2009; 67(6): 624-628.*
12. *Stubbs J, Haw C, and Taylor D. Prescription errors in psychiatry–a multi-centre study. J. Psycho pharmacol. (Oxford). 2006; 20(4): 553-561.*
13. *Mohan P, Sharma A, and Panwar S. Identification and quantification of prescription errors. Med J Armed Forces India. 2014; 70(2): 149-153.*
14. *Perwitasari, DA, Abror J, and Wahyuningsih I. Medication errors in outpatients of a government hospital in Yogyakarta Indonesia. Int. J. Pharm. Sci. Rev. Res. 2010; 1(1): 8-10.*
15. *Katzung BG. Rational Prescribing & Prescription Writing. Basic & Clinical Pharmacology. 2018: 1146-1168.*
16. *Kamel FO, Alwafi HA, Alshaghab MA, Almutawa ZM, Alshawwa LA, Hagras MM, Park YS and Tekian AS. Prevalence of prescription errors in general practice in Jeddah, Saudi Arabia. Med Teach. 2018; 40(sup1): 522-529.*
17. *Fernández-Llamazares CM, Pozas M, Feal B, Cabañas MJ, Villaronga M, Hernández-Gago Y, De Villegas MR and Álvarez-del-Vayo C. Profile of prescribing errors detected by clinical pharmacists in paediatric hospitals in Spain. Int J Clin Pharm. 2013; 35(4): 638-646.*
18. *Gider Ö, Ocak S, and Top M. Evaluation of electronic prescription implications in turkey: an investigation of the perceptions of physicians. Worldviews Evid Based Nurs. 2015; 12(2): 88-97.*
19. *Shahaibi NM, Al Said LS, Chitme H, and Kini T. Identifying errors in handwritten outpatient prescriptions in Oman. J Young Pharm. 2012; 4(4): 267-272.*
20. *Norsa adah B, Norbanee T, Zaliha I and Wil AC. Prescription writing errors by doctors at Pasir Mas Hospital. Tokyo Jikeikai Ika Daigaku Zasshi. 2006; 13(1): 15-18.*