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Research Article

PRESCRIPTION WRITING PRACTICES AND ERRORS IN PRESCRIPTIONS CONTAINING CARDIOVASCULAR DRUGS ESPECIALLY ACE INHIBITORS IN KARACHI, PAKISTAN

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ABSTRACT

Objective: This is the first study related to the prescribing errors in cardiovascular prescription drugs especially Angiotensin converting enzyme inhibitors (ACEIs) conducted with the aim to identify the prescribing errors in ACEIs prescriptions and to determine how to reduce these errors.

Methods: The study period was September' 2012 till September' 2013. A total of 460 prescriptions containing ACE inhibitor drugs were retrospectively analyzed to identify the common errors in them after collecting from different outpatient settings of Karachi, Pakistan.

Results: The extent of occurrence of errors was calculated; the highest number of the prescriptions (94.34%) failed to mention the patient's weight and in least proportion of the prescriptions (0.43%) prescriber signature was not mentioned. The drug-drug interaction was found in 80.65% of prescriptions. Only the brand name of the drug was mentioned in all the prescriptions. The main reason of prescription errors was maximum numbers of patients, less knowledge related to prescription writing guidelines to prescribers, and lack of pharmacy services.

Conclusions: We concluded from this study, that there is a high percentage of prescription errors in outpatient settings. The only solution is that the physicians should be provided with the educational training to improve their prescription writing skills according to World Health Organization guidelines for prescription writing or other recognized and published standards. The computerized physicians order entry system should be introduced. The pharmacist can also play a vital role in minimizing and preventing these prescription errors. The health care system without pharmacists is unable to cope effectively.

Keywords: Angiotensin converting enzyme inhibitors, Outpatients, Prescriptions, Prescribing error , Karachi.

INTRODUCTION

A prescription is a written order from the physician to pharmacist, which consists of drug's name, dose, strength, and duration of use. Prescription should contain the prescriber name, address, contact number, and signature and also mention name, address, contact member, age, gender of patient, and also directions, instructions, and warnings for patients [1,2]. The prescriber is not always a doctor but can also be a paramedical worker, such as a medical assistant, a midwife or a nurse. The dispenser is not always a pharmacist, but can be a pharmacy technician, an assistant or a nurse. Each country has its own standards for the minimum information required for a prescription, and its own laws and regulations to define which drugs require a prescription and who is entitled to write it . In some countries, pharmacists do not give out drugs on prescription older than 3-6 months. The importance of the prescription is exaggerated by the fact that it becomes a medico-legal document once it is signed by the prescribing authority and thus must be written completely and legibly [2]. The frequency of drug prescription errors is high [3]. Prescribing and administering errors are the two most common types of medication errors [4]. The prescriber should follow the proper guidelines for writing a prescription in order to minimize prescribing errors.

Another researcher describes prescribing error as an error, which occurs as a result of a prescribing decision or in the prescription writing process. As a result, there is an unintentional significant reduction in the probability of treatment being timely and effective and increase in the risk of harm [5]. A survey from Italy had revealed that 1 in 4 prescriptions were not fully completed or were illegible. Overall 23.9% of prescriptions were illegible, and 29.9% of prescriptions were incomplete [3].

A study conducted in a hospital at New York State, about 402 errors detected the most common type of dosage form prescribing errors were the errors related to cardiovascular drugs. The factors related to these dosage form errors include : Inadequate caregivers and lack of knowledge of patient, confusing and inconsistent nomenclature, ignorance to the safety in drug preparation and packaging design, product marketing and inadequate health care system processes to safeguard patients [6].

The present study was done to understand the current prescription writing practices and to detect the common errors in prescriptions containing angiotensin converting enzyme inhibitors (ACEIs) drugs in outpatient settings in Karachi, Pakistan. Not a single study on ACEIs drug prescription errors has been carried out in Karachi, Pakistan. Hence, this study has been conducted to report the trend of prescription writing practices and errors in ACEIs prescriptions, to find the extent of occurrence of these errors.

METHODS

Data processing

The stages of data processing were literature search, data screening, data collection, and data analysis.

Literature search

A literature search is "a systematic and clear approach to the identification, computing, and references of independent studies taken from published articles, papers, newsletters for the purpose of finding information on a specific topic, synthesizing conclusions, identifying areas for future study, and developing guidelines for clinical practice" [7].

Data screening

Inclusion criteria:

1) Prescriptions of cardiovascular outpatients containing ACE inhibitors drugs.
2) All prescriptions had to be taken from cardiovascular hospitals and clinics of Karachi.
3) All drugs which are frequently prescribed in our community.
4) Patients of both the sexes.

Exclusion criteria:

All prescriptions that were illegible or not clearly written and did not meet the inclusion criteria were excluded.

Collection of prescriptions

A total of 460 prescriptions containing ACEIs drugs were collected from the pharmacy department of large tertiary care hospitals and different outpatient settings in Karachi, Pakistan.

Analysis of prescriptions

After collection of 460 prescriptions of ACEIs, they were analyzed retrospectively in order to observe the prescribing behavior of doctors. The prescriptions were then analyzed to identify prescription errors as per World Health Organization [2], parameters for prescription writing, [8] and Drug Information handbook [9] criteria. Executing a safe and effective prescription order require communication of complete information to all anticipated readers. A complete order should contain at a minimum: Patient name, patient-specific data, generic and brand name of drug, medication strength in metric system, dosage form, amount to be dispensed in metric units, complete indication for use including route of administration, duration, dosing, frequency, medication purposes, and number of authorized refill [10].

Data analysis

Microsoft office 2010 and SPSS, version 17.0 was used for analysis of the data. Drug-drug interactions were identified by the Micromedex.2.0. Drug-Reax database [11].

RESULTS

In the present study, a total of 460 prescriptions containing ACEIs drugs were collected. Prescriptions were evaluated for the presence of essential elements to be included in the prescription order, and the data were recorded [2,7,8,12]. Of 460 prescriptions, 94.34% prescriptions were missing the weight of the patients, 80.65% prescriptions were with potential for drug interaction, 75.86% prescriptions with missing the patient's diagnosis, 57.17% prescriptions without patient's age. In 61.73% prescriptions patient's sex was not mentioned, 6.08% prescriptions having the wrong strength of the drug, 3.04% prescriptions having ambiguous medication order. It was found 0.2% prescriptions without using the metric system, 1.55% prescriptions having Misspelling of medicine, and 1.55% prescriptions having an error of omission. The name of the patient was mentioned in the majority of the prescriptions. It was observed that the patient's age, weight, diagnosis, and sex was not mentioned in maximum number of prescriptions (Table 1 and Fig. 1). The name, qualification, and prescriber signature were seen in the majority of the prescriptions that is 76.1%, 86.96%, and 99.56% prescriptions, respectively. The address and telephone number of the doctor were missing in 56.52% and 78.3% of prescriptions (Table 2).

Table 1: Analysis of errors in ACEI prescriptions (n=460), (BNF, 2000; De-Vries *et al.*, 1995; Lacy *et al.*, 2001; Lofholm and Katzung, 2001)

Error category/standards	Error/not followed	Not error/ followed
Ambiguous medication error	14 (3.04)*	446 (96.96)
Age of patient not mentioned	263 (57.17)	197 (42.83)
Weight of patient not mentioned	434 (94.34)	26 (5.66)
Sex of patient not mentioned	284 (61.73)	176 (38.27)
Misspelling of medicine	07 (1.55)	453 (98.48)
Error of omission	07 (1.55)	453 (98.48)
Writing wrong medical abbreviation	06 (1.30)	454 (98.70)
Writing wrong dosage form	0	460 (100)
Writing wrong strength	28 (6.08)	432 (93.92)
Prescribing medicine without metric system	10 (2.17)	450 (97.83)
Writing wrong decimal placement	0	460 (100)
Writing wrong units	0	460 (100)
Prescribing tablet without strength	6 (1.30)	454 (98.70)
Omission of prescriber's signature	2 (0.43)	458 (99.57)
Drug–drug interaction	371 (80.65)	89 (19.35)
Prescribing wrong medicine	0	460 (100)
Patient's diagnosis not mentioned	349 (75.86)	111 (24.14)
Omission of route of administration	0	460 (100)

*Data in the parenthesis indicates percentages, ACEI: Angiotensin converting enzyme inhibitors

Table 2: Prescriber/doctor information written on the prescriptions analyzed (n=460)

Prescriber/doctor	Yes	No
Name	350 (76.1)*	110 (23.91)
Qualification	400 (86.96)	60 (13.04)
Address	200 (43.48)	260 (56.52)
Telephone number	100 (21.74)	360 (78.3)
Signature	458 (99.56)	02 (0.43)

*Data in the parenthesis indicates percentages

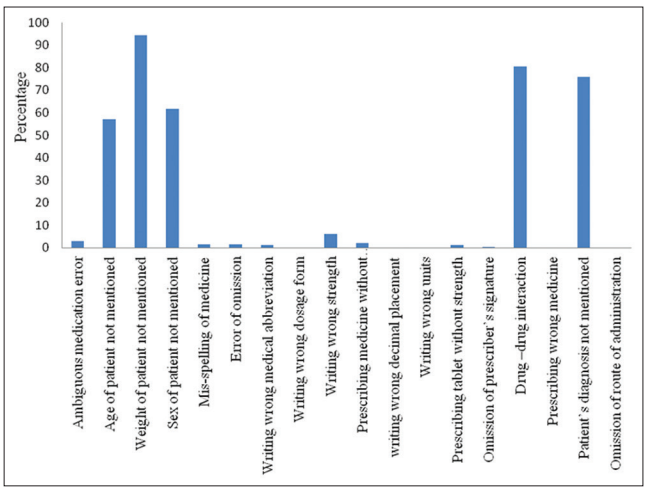

Fig. 1: Analysis of errors in angiotensin converting enzyme inhibitors prescriptions

DISCUSSION

In the present investigation, a total of 460 prescriptions of ACEI drugs were collected and evaluated for the presence of errors. In 94.6% of prescriptions weight of the patient was not mentioned and also agreed to the findings of Vaishali *et al*. and Irshaid *et al.* [13,14]. They found that none of the prescriptions contained the patient's weight. The present study showed that patient's weight is not mentioned in maximum number of prescriptions written by doctors in Karachi, Pakistan. In case of patient diagnosis, current data revealed that 75.9% of the prescriptions were missing the diagnosis. This is in contrast to the studies of Ghoto *et al.* they identified this error in 69.58% of prescriptions [15]. Irshaid and his co-workers also identified this error only in 15.1% prescriptions. Bawazir in 1993 has also reported this error in 9.8% of prescriptions [16]. Balbaid and Al-Dawood had found this error only in 6.8% of the prescriptions [17].

The presence of name of the patient in 96.5% of the prescriptions corresponds to the findings of Vaishali *et al.* who also found 97% of

their prescriptions complete with name. Irshaid and *et al.* also found that 94.6% prescriptions mentioned the name of the patients. A large number of deficiencies also have been found regarding the sex and age of the patient. Our study investigated that 57.2% and 61.3% of the prescriptions were missing the patient age and sex (gender), respectively. Vaishali *et al.* found that 10% and 11% of the prescriptions in which the sex and age of the patient were not written respectively, and Ghoto *et al*. 2013 also identified that 44.05% and 25.17% prescription had not mentioned the sex (gender) and age of the patients, respectively. Balbaid and Al-Dawood 1998 identified that only 10 and 4.1% of prescriptions were missing the patient age and sex, respectively.

Regarding the errors category of writing an ambiguous medication error we explored that 3.6% of the prescriptions were not written clearly. Our result is similar to the findings of Balbaid and Al-Dawood 1998 who found 7.2% prescriptions had poor and incomprehensible handwriting. Meyer in 2000 and Makonnen *et al*. in 2002 had reported 15% of this type of error [18,19].

There are large numbers of deficiencies in the information regarding the medicine. Wrong abbreviation of drug, error of omission, and wrong strength were found on 1.5%, 1.5%, and 6.1% of the prescriptions, respectively. Concerning the strength of the medications, it is a most important factor especially when a drug is available in the market in different strengths. Our study revealed that 6.1% of the prescriptions mentioned the wrong strength of the medication. On the other hand, this result is dissimilar to the result of Ghoto *et al.* who stated that 49.3% of the prescriptions were with the wrong strength of the medication. The present results are very less in percentage to those reported by Vaishali *et al.* who identified that 26.8% of prescriptions did not mentioned the strength of the drug, whereas Irshaid *et al.* stated that 52.8% of the prescriptions were missing the strength of medications.

There are number of studies which suggested implementing computer-based system for prescribing the drugs. Javier *et al*. in 2002, Nightingale *et al.* in 2000 [20,21], and also Meyer in 2000 suggested that electronic prescription system can be used to improve the prescription writing by removing the illegible prescriptions. Different studies have shown that it is possible to reduce the medication and prescribing errors by using computer-based system of prescribing medications [22,23]. Varies *et al.* in 1995 reported that the educational training program can also improve the prescription writing. The implementation of such program can reduce these errors of omission as this involves less manpower.

There have been many studies conducted on drug interaction, which is a critical issue in the health care system. In our study, potential drug-drug interactions were observed in 80.4% of the prescriptions. Another study conducted by Ghoto *et al.* who reported that 32.16% prescriptions show the drug interaction. A similar study conducted by Lars and *et al.*, who reported that 62% persons were exposed to potential drug interaction with the single drug, and 38% with two or more different drugs [24].

CONCLUSIONS

It was concluded that there is a high percentage of prescription errors in practice. It was found that the majority of the errors were related to the incomplete or wrong information of patient, prescriber and drugs on the prescriptions. This leads to various problems of dispensing, administration of medicine, drug misuse, and drug interaction. Educational intervention programs and computer-aided prescription order entry can substantially contribute on lowering of these errors and impose prescription writing or other recognized and published standards. The computerized physician order entry system should be introduced. The pharmacist can also play an important role in preventing the errors by reviewing the prescriptions.

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