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Research Article

Assessing commitment to principles of prescription writing for outpatients in teaching hospitals of Ahvaz: 2015

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ABSTRACT

Background: The observance of standard prescription principles by physicians increases the likelihood of proper treatment, its effectiveness and patients' recovery. The present study aims to explore the level of physicians' observance of prescription standards while visiting outpatients referring to teaching hospitals in Ahvaz.

Methods: This cross-sectional study was conducted on 550 prescriptions written for outpatients referring to (Ahvaz University of Medical Sciences) affiliated hospitals in 2015. In each prescription, issues related to legibility, medication form and order and identity information were extracted and recorded on a checklist prepared based on the World Health Organization guidelines. Each prescription was scored with a score range from 0 to 21 and then analyzed using descriptive statistics.

Results: The average number of items per prescription was 3.48; 1396 drugs (72.78%) were written legibly; 1032 drugs (58.81%) were prescribed incorrect forms; 1281 drugs (66.07%) were prescribed in correct order; doctor's identity was written in 98.08% of the examined prescriptions; patient's identity was written in 80.36% of the prescriptions; and 1428 drugs were prescribed consistent with the standards of prescription.

Conclusions: Study results revealed that most of the examined doctors prescribed medications consistent with the standards of prescription; however, the two dimensions of medication form and order of use were not adequately noticed by doctors. Use of electronic prescriptions can improve the communication of prescriptions in teaching hospitals.

Keywords: Medications, Outpatients, Prescriptions

INTRODUCTION

Prescription is a written instruction by a medical practitioner intended for a specific treatment for a particular patient.[1] Prescription is the last stage of a doctor - patient relationship and is considered as a medical deed.[2] Writing prescriptions is one of the most common and powerful therapeutic tools for doctors.[3] Prescriptions are written to improve life quality of patients.[4] Therefore, the observance of prescription standards by doctors increases the likelihood of proper treatment, its effectiveness and patients' recovery.[5,6] A good prescription is logical, evidence-based, clear, complete and able to improve treatment processes.[7] The Medication process begins with doctors' medical orders.[8] Medication errors are the most frequent medical errors and more than two-thirds of these errors are due to physicians' mistakes. Some of these medication errors

include prescribing medications without paying attention to their complications and patients' medical histories or wrong medication, improper drug dosage, frequency or duration of use.[9-11] Recent studies showed that medication error is the eighth leading cause of death worldwide and in the United States, 2-14% of patients are affected by it. Medication error is a preventive event that may cause inappropriate medication use or patients' harm.[12] In Iran, 55 thousand medical errors are reported annually among which 10500 cases lead to death and 23000 to impairment.[9] In a study conducted on dental prescriptions in Tabriz, 98.5% of the prescriptions was erroneous. The errors included medication name (94.9%), route of administration (92.8%), spacing doses (72.4%) and the amount of medication use (60.8%).[13] Javadi et al (2008) study results indicated an average of 4 erroneous prescriptions out of every 1000 prescriptions. illegible handwriting on prescriptions was the most important and common causes of medication errors.[2]

Observance of prescription standards could avoid medication errors. A rational prescription is the one in which all mentioned standards are observed and clear information regarding the prescribed medications and the order of their use are provided.[14] Prescribing high percentages of injecting drugs and antibiotics, ignoring drug interactions, not including drug use instruction in the prescriptions and illegibility of physicians handwriting were the most frequent prescription issues in Iran.[15] In a study in Hamadan, significant differences were observed in the average observance of prescription standards between post specialty physicians, physicians with specialty and interns who worked in teaching hospitals (p<0.05). However, no significant difference was reported between interns and specialized physicians and between residents and post specialty physicians (p>0.05). Furthermore, no significant difference was observed in the level of prescription standards observance between general, specialized and post specialty physicians who worked in non-teaching hospitals.[5]

In a study conducted in Isfahan, 84% of the examined prescriptions written by interns were illegible; in 82% of the prescription, generic names were used; in 6%, drug form was not specified; in 4%, dosage strength was not mentioned; in 63%, drug use instruction was not specified; in 51%, drug use spacing was not indicated; and only in 18.3%, drug use instruction was specified adequately.[16]

Jeddi et al had reported that 88% of the received prescriptions by Medical Services Insurance Organization were legible; 72% contained drug form; 52% included drug use instruction; 80.12% contained patient's identity information; 93.96% contained physician's identity information and in average, on 3646 drugs, prescription principles were observed.[1]

A high quality prescription reflects a high quality treatment process in general. One of the best ways to review medication pattern in a society is to evaluate physicians' prescriptions.[17] In Iran's health care reform program implemented since 2014, one of the important issues to improve the quality of outpatients services was an adequate observance of prescription standards by the doctors.[2] Thus, the present study aimed to analyse the level of physicians' observance of prescription standards while visiting outpatients referring to teaching hospitals in Ahvaz, Iran.

METHODS

This cross-sectional study was conducted on 550 prescriptions written for outpatients referring to affiliated hospitals of Ahvaz University of Medical Sciences in 2015. To determine the sample size, Cochran sampling formula was used (p=0.6; q=0.4; z=1.96; d=0.2). After insertion into the formula, the sample size (n) was determined to be 23.05 for each specialty. However, in order to prevent loss of samples, the sample size was decided to be 25. Consecutive sampling was used. Prescriptions written by hospital-based physicians were analysed by a graduate student in the field of medicinal chemistry immediately after the meetings between patients and physicians. Therefore, 550 prescriptions were selected written by doctors in 22 different medical specialties (including endocrinology, ear, nose, and throat, cardiovascular, urology, digestion, lung, infant, internal, poisoning, skin, neurology, general physician, general surgery, infectious, genetics, orthopedics, hematology, ophthalmology, neurosurgery, psychology, obstetrician, and cardiovascular surgery). A data gathering form was developed based on WHO recommendations about commitment to principles of prescription writing[1], in each prescription, related issues to drug form (1. Proper spelling; 2. Dosage form; 3. Proper spelling of dosage form), Medical order (4. The number of drugs; 5. Drug dosage; 6. The order of drug use in Latin; 7. Medical recommendations; 8. Duration of drug use; 9. Instruction for drug use; 10. Drug use frequency), Physician's identity information (11. Name; 12. Family name; 13. Specialty; 14. Medical system code; 15. Signature), Patient's identity information (16. Name; 17. Family name; 18. Age; 19. Gender; 20.Weight) and eligibility (as the 21st item) were analysed for each drug. If the handwriting was comprehensible without referring to any other person or the physician himself, it would be considered as eligible. Each of the mentioned 21 items had either 0 or 1 score and the total score for each prescription was in the range between 0 and 21 which was recorder on the prepared checklist. The scores were analysed using descriptive statistics (frequency and frequency percentage; SPSS16) and categorized in tables. For better analysis, the scores were divided into four equal score categories including weak (0-5.25), low intermediate (5.26-10.5), high intermediate (10.5-15.75) and good (15.76-21).

RESULTS

The average number of items per prescription was 3.48 and totally 1918 items were prescribed in the 550 examined prescriptions. Among all 22 medical specialties, cardiologists and geneticists had prescribed the highest and the lowest number of drugs per prescription (5.2 and 2 items respectively). Moreover 685 (35.71%) prescriptions were written for male patients and 1233 (64.29%) for female ones; 21.10% of the patients were below 20 years old, 32.20% between 20 and 40 years old and 46.70% above 40 years old.

Totally 1396 drugs name (72.78%) were written legibly; 944 (49.22%) drug names were written with correct spelling; 959 (50%) drugs had correct form and 1243 (64.81%) drug form were written with correct spelling.

Table 1: Frequency distribution of prescription standards observance (dimensions) in outpatients' prescriptions.

Average of score	Maximum score	Written pharmaceutics		Variables
		Number	Percent	
0.73±0.44	1	1396	73.27	legibility
1.61±0.93	3	1032	53.81	Pharmaceutical form
4.62±1.19	7	1281	66.07	Medical order
4.94±0.23	5	1895	98.80	Physician's identity information
4.01±0.13	5	1538	80.36	Patient's identity information
15.92±1.67	21	-	-	Total

Table 2: Prescription standards observance based on specialty.

Patient's identity information		Patient's identity information		Physician's identity information		Medical order		Pharmaceutical form		legibility		specialty
p	n	p	n	p	n	p	n	p	n	p**	n*	
76.30	19	80	20	99.20	25	74.29	19	56.00	14	72	18	Endocrinology
82.51	21	80	20	100.0	25	72.57	18	80.00	20	80	20	Otorhinolaryngology
81.67	20	80	20	99.20	25	73.14	18	76.00	19	80	20	Cardiology
77.56	19	80	20	100.0	25	73.14	18	70.67	18	64	16	Urology
70.35	18	80	20	91.20	23	68.57	17	52.00	13	60	15	Gastroenterology
79.19	20	80	20	95.20	24	75.43	19	77.33	19	68	17	Pulmonology
73.66	18	80	20	98.40	25	64.57	16	53.33	13	72	18	Pediatrics
71.38	18	80	20	99.20	25	57.71	14	40.00	10	80	20	Internal
68.34	17	80	20	99.20	25	57.14	14	33.33	8	72	18	Toxicology
70.51	18	84	21	99.20	25	60.00	15	41.33	10	68	17	Dermatology
73.43	18	84	21	98.40	25	63.43	16	45.33	11	76	19	Neurology
72.04	18	80	20	100.0	25	58.86	15	41.33	10	80	20	General practitioner
73.84	18	80	20	96.80	24	61.71	15	50.67	13	80	20	General surgery
69.45	17	80	20	100.0	25	60.57	15	46.67	12	60	15	Infectious Disease
70.86	18	80	20	100.0	25	62.29	16	44.00	11	68	17	Genetics
74.78	19	80	20	100.0	25	64.57	16	45.33	11	84	21	Orthopedics
71.27	18	80	20	99.20	25	65.14	16	44.00	11	68	17	Hematology
70.19	18	80	20	98.40	25	64.57	16	44.00	11	64	16	Ophthalmology
74.13	19	80	20	100.0	25	64.00	16	42.67	11	84	21	Neurosurgery
83.28	21	80	20	100.0	25	73.71	18	74.67	19	88	22	Psychiatry
76.11	19	80	20	100.0	25	64.57	16	56.00	14	80	20	Obstetrics and Gynecology
77.41	19	80	20	100.0	25	73.71	18	69.33	17	64	16	Cardiovascular Surgery
74.47	1862	80.36	20.09	98.80	24.70	66.08	16.52	53.82	13.45	73.30	18.30	Average

* number of correct prescription, ** percentage of commitment to prescription principle

About the drugs prescribed by physicians, the number of 1220 (58.39%) drugs, the dosage of 1276 (66.53%), the order of drug use in Latin of 831 (43.33%), Physician's recommendations 783 (540.82), the drug use duration of 1768 (92.18%), the drug use instruction of 1603 (83.58%) and the frequency of use of 1551 (580.87) drugs were mentioned. The physician's name, family name, specialty and medical system code was recorded in all of the examined prescriptions and the physician's signature was observed in 517 (94%) of the prescriptions. Patient's identity (including name, family name, age and gender) were recorded in all of the examined prescriptions and his/her weight was observed in 10 (1.8%) of the prescriptions (Table 1).

On average, 1428 drugs were prescribed based on the prescription standards and the overall score of physicians' observance of prescription was 15.92 (or good).

The highest and the lowest level of prescription standards observance were in prescriptions written by psychologists (%83.27) and dermatologists (%68.33) respectively (Table 2).

DISCUSSION

The average score of observing prescription standards were 15.92 which was considered as good, which was consist with previous studies results.[1-5,8] The average number of prescribed items per prescription was 3.48. The average numbers of items per prescription had been reported by the World Health Organization and in Iran 1.5 and 3.5 respectively.[5-7,9] Moreover previous studies in Iran had reported the average number of items per prescription as 2.85 and 1.57.[18,19] Prescribing too many drugs may lead to increased incidence of medication complications, failure to follow medical orders, increased incidence or severity of interactions and ultimately discontinuation of treatment or prolonged medical treatment.[20] Considering Iran as a developing country to which many pharmaceutical raw materials and a number of medications are imported, irrational prescription of medications makes great financial losses for the country in addition to its harmful effects on patients' health.[21]

Results showed that 1396 (72.78%) drugs were written legibly in the examined prescriptions. In the analysis of prescription quality in medical records of hospitalized patients, in Rafsanjan hospitals, 70.7% of the prescriptions were written legibly.[22] However, literature had reported different results about drugs legible writing in prescriptions ranging from 82.4% to 100%.[23-25] Zeraati et al had reported a different results as 43.9% of the prescriptions written in Hamadan teaching hospitals and 54.5% in non-teaching hospitals were legible.[5] To reduce medication errors initiated by illegible handwriting, electronic prescriptions are being used nowadays. 522000 medication errors in the United States have been prevented by the use of e- prescriptions.[26, 27]

Correct forms of drugs were recorded in 1032 (53.81%) prescribed items. Drug complete name and form was correctly recorded in 33.7% and 90.6% of prescriptions in Hamadan teaching hospitals and 49.2% and 90.6% in other hospitals of Hamadan, respectively.[5] However, Heidari et al had reported that drug complete name and form was mentioned in 75% and 86.2% of the prescriptions, respectively[22] which were not consistent with our results. Despite many problems in standard prescription writing in Iran, no specific course or educational program has been developed for medical students yet. Delfan and colleagues believed that the development of a specific course for prescription writing is a necessity which must be considered by the designers of medical curriculum.[28]

Results revealed that 1281 (66.07%) drugs were prescribed with correct medical orders. In an Indian study, drug dosage was mentioned in 65% of the prescriptions.[23] Al-Dhawailie et al reported that in the prescriptions written for hospitalized patients in a Saudi Arabia teaching hospital, correct frequency of drug use and correct drug dosage were written erroneously in 23% and 12% of the cases and 7% of the examined prescriptions were vague.[29] Moreover comparing teaching and non-teaching hospitals performance through prescription standards in Hamadan revealed that drug use instruction, dosage and duration of use were respectively mentioned in 25.1%, 68.5% and 60% of the prescriptions written in teaching hospitals and in 42.5%, 58.2% and 20% of the prescriptions written in non-teaching hospitals.[5] Dental prescriptions assessment showed that drug dosage and drug use instruction were correspondingly mentioned in 100% and 94% of the examined prescriptions.[25] In a study by Finji, drug dosage was not mentioned in 63% of the examined prescriptions.[30]

In 98.08% of the examined prescriptions in the present study, the identity of the physician was mentioned. In a study on prescription writing skill among two groups of dentists, 98.1% of the prescriptions written by the first group and 22.8% of the prescriptions written by the second group had the dentist's signature; furthermore, 46.3% of the prescriptions written by the first group and 15.8% of the prescriptions written by the second group had medical system code as well.[25] Also in prescriptions which were assessed by Zeraati et al (2014), all prescriptions had the doctor's signature.[5] According to the existing insurance regulations in Iran, if the physician's name and signature are not mentioned in a prescription, the prescription is subject to medication deduction. Thus, physicians usually record their signatures in their prescriptions. The existence of this control system can explain the obtained high percentage of physicians' identity inclusion in this study.

Patient identity is important information that must be recorded in a prescription. Results revealed that in 80.36% of the examined prescriptions, the identity of the patient was mentioned. Studies which were done in Iran

had reported a high rate of patients' identity recording in prescriptions[5,25] compared with some other countries studies.[6,23] This might be a result of the specific form of medical insurance booklets in which name, family name, age and gender of the patients are previously printed by the insurance companies.

CONCLUSION

Results indicated an adequate observance of prescription standards by Iranian physicians. However, the obtained high percentages of the items of physician's and patient's identity information were mostly due to the specific form of medical insurance booklets in which patient's identity information is previously printed by insurance companies and insurance companies' requirement for physician's signature. Moreover, the levels of physicians' observance of the most important items of drug form and drug use order were not satisfactorily. This study was solely conducted on the prescriptions written by physicians in teaching hospitals. Therefore, it is recommended to conduct future studies on prescriptions written in both teaching and non-teaching hospitals through designing a checklist based on medical insurance booklets' information without considering patients' and physicians' identity information. Moreover, in order to prevent medication errors related to illegibility of physicians' handwritings, it is recommended to apply prescription software or e-prescriptions.

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LIMITATIONS

Medication errors and drug interactions due to the prescription errors were not assessed in the study.

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