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Medication Prescribing Errors in Hospitals at Ibb City-Yemen

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ABSTRACT

The specific objectives addressed in this paper are to examine the types, and the causes of prescribing errors among the doctors, nurses and pharmacists at Ibb city hospitals in Yemen. The data were drawn by using a questionnaire, a sample random sampling procedures to select 388(doctors, nurses and pharmacists) from the private and the governmental hospitals at Ibb city in Yemen, using a descriptive analysis. The researcher found that the participants agree about the unintentional mistakes as a first common types of the prescribing errors with the overall μ= 3.81, intentional violation mistakes as second types of the prescribing errors with the overall μ= 3.75 and the intentional mistakes as a third common types of the prescribing errors with the overall μ= 3.68. The participants agree about the staff as the first common causes with the overall μ= 3.93, lack of knowledge and environmental condition as the second common causes with the overall μ= 3.90, lack of patient necessary information and lack of system and supervision are the third common causes with the overall μ= 3.89, prescriber lapse and slip as the fourth common causes with the overall μ=3.87. These finding are the first to document the types and the causes of medication prescribing errors in Yemen.

Keywords: Causes, errors, physician-prescribing, types.

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INTRODUCTION

Errors in general are an integral part of human life. The origin of errors are resulted from both the natural process of cognitive and behavioral adaptations that develop the correct behavioral skills[1].Prescriptions are the process of communicating medications instructions between prescribers who write the prescription and pharmacists who dispense these medications. Ruefully a large number of paper prescriptions in outpatients contain one or more errors, resulting in great opportunities to harm patients. An estimated 1 of every 131 deaths in outpatient setting is due to medication prescribing errors[2].Widespread prescribing errors are global phenomenon, so we must pay attention to the patient safety in different healthcare systems. Many patients have been harmed by prescribing errors every year, and around one third to one half of these prescribing errors can be avoidable[3].About 200 million prescriptions are written in health care facilities each year and 7000 doses of drugs are daily administered in ahospital[4].Medication prescribing errors occur frequently and account for 10–20% of all adverse events in hospitals. They cost an estimated £200–400 million per year, excluding the unknown costs in primary and community care[4].It was estimated that errors of prescribing kill 7000 patients a year in the United States of America[2]. Drug prescription and administration errors are an important source of iatrogenic morbidity and mortality in hospitalized patients[5]. The Audit Commission's report that over 80.000medication-prescribing incidents reported annually to the United Kingdom National Patient Safety Agency the medication prescribing errors are the third most common cause of patient safety incidents[5].There are medication reactions or side effects treatment which are often predictable and acceptable risks of treatment that can be minimized with careful use of the medication[4].Whereas reactions that are unpredictable cannot be avoided during treatment, medication errors resulting from mistakes, slips or lapses during the prescribing, dispensing, administration or transcribing stage that can be avoidable[4].Every stage of the medication use process (storage, prescription, transcription, preparation, dispensation, and administration of a drug) is vulnerable to mistakes or errors but the most frequent and common errors occur during prescribing and administration of medication[7].Writing a prescription order is one of the most important stages in the medication system with a high degree of influence on the intended therapeutic goals[6].

Statement of the Problem

The morbidity and mortality associated with outpatient drug-related problems in the United States cost an estimated $177 billion annually[7].due to the higher cost of the treatments resulted

from the errors of prescribing and the side effects of the medication prescribing errors. The researcher in this study aims to identify the types of the medication prescribing errors and the causes of these errors. Medication prescribing errors are serious public health problem and have received a great deal of attention in last few years[7].

Objectives of the Study

The general objective of the study is to explore the types and the causes of the medication prescribing errors.

Questions of the Study

Many questions arise justifying the need to conduct the present study. These questions are the following:

What are the most common medication prescribing errors form the points of view of doctors, nurses and pharmacists?

What are the most common causes of the medication prescribing errors form the doctors, nurses and pharmacists' views?

Variables Definition:

A medication error is failure in the drug treatment process that leads to or has the potential to lead to harm the patient[8]. Doctors: include the General practitioners, dentists, surgeons, consultants and the specialists.

Prevalence of Medication Prescribing Errors

The prescribing errors in pediatric departments are widespread, and made mostly by junior doctors; however some of the researchers having a difficulty detecting errors in order to demonstrate actual errors[9].the incidence rate of prescribing medication errors was 40.5 per 100 person annually[10].theresult of an overall medication prescribing error of antibiotics was 58.07% in Ethiopia[11].indicates that the drug administration errors from the nurses were popular in developing countries such as Malaysia is similar to that in the developed countries[12]. South Korea, reported that the medication errors mostly prevalence during the day-shift in the hospitals[8].inSpanish showed that the most of the errors that occurred were reported in the prescribing stage; dispensing errors were less frequently[13]. Further more, resulted that the errors have been reported in handwritten descriptions of almost 15% and with electronic prescribing of 8% orders[6]. the Prescribing or monitoring errors were discovered for one in eight patients, which was around one in 20 of all prescription items[14].the emergency room was more potential to report medication administration errors than other units in the hospital[15].

Types of Medication Prescribing Errors

The most common type of prescribing medication errors was incorrect calculation of drugs dose which is a common in actual health practice. In addition, reported that the incomplete prescriptions and dosing errors were the two most prevalence types of prescribing errors[6,1,9,11] the drug-to-drug interaction or drugs contraindication and duration or frequency of drugs inadequate were the most common types of prescribing errors[10].Other study reported that the common types of the prescription errors were: wrong patient, patients contraindication to drugs, wrong drug , wrong dose or frequency, wrong drug formulation, wrong route of administration, unclear orders on prescriptions[16]. All prescriptions in general had one or more omission errors. However, the commission errors are not prevalent except wrong strength and dose of drugs that were disclosure in 10% of prescriptions[3]. The administration errors represent 43.1%, preparation medication errors 24.1% and transcription medication errors are 2.5%. Administration and controlling were set to be the most common errors[17]. The written errors reports of incidents were prescribing, dispensing near misses, and dispensing[13].indicated that the most frequent error was presence of illegible element in the prescription that represents (59%)[18].The illegible handwriting was the most common types of errors[19]. 88.07% of prescriptions had no doctor contact number,86.84%of prescription did not have an indication[20].

Causes of Medication Prescribing Errors

The previous studies grouped the causes of prescribing errors into seven categories, which were the prescriber, team, patient, environment, the task, the system of prescribing, and the primary–secondary care interface, which suggested that the most prescribing errors were made due to prescriber slips in attention. Lack of knowledge regarding drug was not the single substantiated factor in any incident. There were many of the risk factors identified included individual, team, environment, and task factors. Organizational factors identified include inadequate training and /or experience, and lack of self-awareness regarding the prescribing errors. also grouped the causes according to reasons into active failures, error-provoking conditions and latent conditions. [14, 21, 22, 23, 24]. The most frequently active failure error was a mistake due to inadequate knowledge regarding the medication or the patient. Skills-based slips and memory lapsesdemotic[6]. Where error-provoking conditions that reported like “included lack of prescriber training and experience, fatigue, stress, high prescriber workload for the absence of communication between healthcare providers”. Latent conditions included resistance to question senior colleagues and inadequate provision of training. reported that the most common causes were using abbreviations instead of writing the full names of medications or drugs and similar names of drugs(many of

the companies produce multiple of drugs with the same scientific material). Therefore, the most common cause was the lack of knowledge of prescriber regarding the pharmacological drugs[1,13].the administration of drugs without double-checking was the most common cause of the prescribing errorsin South Korea[8]. the different route of administration represents a considerable factor associated with increased prescribing error[11].

MATERIALS AND METHOD

Research design

This explorative descriptive study was conducted in some hospitals at Ibb City to assess the types and the causes of medication prescribing errors. The researchers has followed the descriptive procedure.

Population and Sampling

The study population consisted of all physician, nurses and pharmacists in the private and governmental hospitals. The researcher used a simple random method to select the participants.

Instruments Used in the Study

The survey instrument used in this study is a self-administrated questionnaire which developed by researchers. The questionnaire used liker scale and consists of three sections:

Section 1 asks about the type of socio-demographic information.

Section 2 asks about the type of medication prescription errors.

Section 3 asks about the causes of the medication prescription errors.

Questionnaire Validity and Reliability

To assure the validity, the following procedures were conducted. Firstly, review was made of the relevant literature and the previous instrument were examined to develop drafts. Secondly, questionnaire was given to professors of health care administrator to judge it. Reliability was measured by using Cranach's Alpha tools.

Table 1: Reliability Statistics

Cronbach's Alpha(types)	N of Items
844	17
Cronbach's Alpha(causes)	**N of Items**
882	24

Data Collection

The researcher gathered data by himself, while the assistants explained the tools used in the study prior to collecting sample data through questionnaires. After that, the researcher distributed all desirable questionnaires directly to the doctors, pharmacists and nurses of hospitals. The data collection was during office hours from 8 am to 2 pm. Five minutes was required to complete

answering the instrument. 338 out of 350 (84.9%) questionnaires were returned.Nearlyeight questionnaire forms were not returned. Out of 350 forms, there were six uncompleted (misused items). The response rate was 96.6%.

Statistical Treatment

The data gathered was used for evaluation and statistical analysis. The data was also analysed using SPSS version19 descriptive and inferential analysis.

RESULTS AND DISCUSSION

Table 2: Socio-demographic characteristics of participants

	Variables level	Frequency	%
Type of hospitals	Government	140	41.4
	Private	198	58.6
	Total	338	100.0
Gender	Male	218	64.5
	Female	120	35.5
	Total	338	100.0
Nationality	Yemeni	274	81.1
	Non-Yemeni	64	18.9
	Total	338	100.0
Occupation	Doctors	108	32
	Nurses	118	34.9
	Pharmacists	112	33.1
	Total	338	100.0
Age	20-30 y	190	56.2
	31-40y	104	30.8
	41-50y	44	13.0
	51-above	0	0
	Total	338	100.0
Years of experience	0-5y	180	53.3
	6-10y	86	25.4
	11-15y	32	9.5
	16-20y	40	11.8
	21y and above	0	0
	Total	338	100.0

More than half of the participants were derived from the private hospitals represent 58.6%. The males represent 64.5% Yemeni nationality who represent 81.1%. The participants majority nurses represent 34.9%, pharmacists represent 33.1%, doctors represent 32%, majority of participants' age range from 20-30 years and represent 56.2%.Most of the participants have an experience 0-5 years, which represent 53.3%.

Table 3: Types of the Medication Prescribing Errors

Types	No.	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Unintentional mistake	1	Incomplete prescription order (missing dose, route of administration, frequency, duration, prescribers' signature).	4.09	.826	3.75	1.149	4.26	.756	4.03	.954
	2	Lack of verbal order.	3.89	.879	3.97	1.045	3.84	1.070	3.90	1.002
	3	Ambiguous or unclear order.	3.56	.813	4.39	.490	4.01	.885	4.00	.817
	4	Unintentional changes in drug dose, routes, frequency	3.74	.778	3.59	1.031	3.58	.790	3.64	.879
	5	Patient allergy profile was not checked during prescribing).	3.56	1.248	3.85	1.043	3.81	.954	3.74	1.090
	6	Drug dose not adjusted for the current clinical condition of the patient (renal, hepatic problem).	3.43	.939	3.61	1.227	3.58	.983	3.54	1.062
Over All Mean			3.71		3.86		3.85		3.81	

The participants agree about the unintentional mistakes as first common types of the prescribing errors with the overall mean 3.81.The nurses' agreement is more than the doctors and pharmacists with the mean of 3.86%.

Table 4: Types of the Medication Prescribing Errors

Types	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Intentional violation	1	No valid indication for drug.	3.80	1.083	3.49	1.245	3.53	1.147	3.60	1.167
	2	Unauthorized drug prescribing.	3.65	.801	4.03	.715	4.01	.777	3.90	.781
Over All Mean			3.73		3.76		3.77		**3.75**	

The participants agree about the intentional violation mistakes as second types of the prescribing errors with the overall mean 3.75% .The pharmacists agreement is more than the doctors and pharmacists with the mean of 3.77%.

Table 5: Types of the Medication Prescribing Errors

Types	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Intentional mistake	1	Wrong dose(high or low).	3.30	1.320	3.73	1.477	3.41	1.018	3.49	1.299
	2	Drug to drug interaction.	4.02	.655	3.86	1.004	3.91	.637	3.93	.790

	3	Inappropriate duration of medication.	3.64	1.234	4.10	.861	4.13	.941	3.91	1.060
	4	Inappropriate of medication frequency "wrong frequency".	3.48	1.000	3.63	.977	3.88	.898	3.67	.970
	5	No drug for medical problem.	3.65	.989	3.19	.915	3.39	1.051	3.40	1
	6	Wrong drug "medication".	3.19	.968	3.78	1.360	3.46	1.0065	3.49	1.171
	7	Incorrect dosage strength.	3.81	.643	4.10	.799	3.12	1.184	3.68	.994
	8	Wrong route of administration.	3.70	.920	4.12	1.047	3.23	.759	3.69	.987
	9	Duplication of therapy.	3.70	.899	4.17	.870	3.57	.956	3.82	.942
Over All Mean			3.61		3.85		3.57		**3.68**	

The participants agree about the intentional mistakes as a third common type of the prescribing errors with the overall mean 3.68%. The nurses' agreement is more than the doctors and pharmacists with the mean of 3.85%.

Table 6: Causes of the Medication Prescribing Errors

Causes	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Staff	1	Few number of staff compared to the Number of patients.	3.63	1.010	3.86	1.191	4.13	.678	3.88	1.004
	2	Lack of clear communication between health care delivery personnel.	4.11	.998	3.92	1.114	3.83	1.064	3.95	1.065
	3	Incorrect instruction from other team involved with the patient.	3.87	.698	4.20	.780	3.79	.716	3.96	.754
Over all mean			3.87		3.99		3.91		**3.93**	

The participants agree about the staff as a first common cause of the prescribing errors with the overall mean of 3.93%. The nurses 'agreement is more than the doctors and pharmacists with the mean of 3.99%.

Table 7: Causes of the Medication Prescribing Errors

Causes	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Prescriber Knowledge	1	Lack of knowledge in medication dose calculation.	4.02	1.136	4.08	1.217	3.80	.769	3.97	1.064
	2	Lack of knowledge regarding the drug therapy.	3.61	1.134	4.19	.816	4.39	.702	4.07	.953
	3	Complexity of individual case.	3.87	.725	3.90	.990	4.05	.858	3.94	.870
	4	Lack of knowledge about the drugs to drug interaction.	3.98	.683	3.51	1.325	3.91	.886	3.79	1.030
	5	Lack of knowledge about the correct of medication	3.98	.854	3.86	.951	3.71	.999	3.85	.941

		nomenclature (abbreviation or spelling).								
	6	Having insufficient skills in proscribing.	3.54	1.054	4.08	1.098	3.71	.790	3.78	1.015
Over All Mean			3.83		3.94		3.93		**3.90**	

The participants' agreement about the lack of knowledge as the second common cause of the prescribing errors with the overall mean of 3.90%. The nurses' agreement is more than the doctors and pharmacists with the mean of 3.94%.

Table 8: Causes of the Medication Prescribing Errors

Causes	**N**	**Statements**	**Doctors**		**Nurses**		**Pharmacists**		**Overall mean**	
			M	SD	M	SD	M	SD	M	SD
Environment	1	Insufficient time of prescribing	4.13	.750	4	.906	3.29	1.262	3.80	1.061
	2	Difficult physical environment	3.57	1.320	3.81	1.054	3.69	1.131	3.70	1.170
	3	High of the workload, time pressure.	4	.986	4.24	.834	4.38	.841	4.21	.899
Over all mean			3.9		4.03		3.79		**3.90**	

The participants agree about the environmental condition as the second common cause of the prescribing errors with the overall mean of 3.90.The nurses agreement is more than the doctors and pharmacists with the mean of 4.03.

Table 9: Causes of the Medication Prescribing Errors

Causes	**N**	**Statements**	**Doctors**		**Nurses**		**Pharmacists**		**Overall mean**	
			M	SD	M	SD	M	SD	M	SD
Information Available (patient)	1	Un availability of the needed patient information during prescribing.	3.70	.630	4.10	1.222	3.59	.876	3.80	.973
	2	Using the patient as the only source of information about his medication history.	4.02	1.050	3.59	1.214	3.98	.644	3.86	1.018
	3	Lack proper documentation regarding patient medication.	3.85	1.150	4.19	.653	3.97	.753	4.01	.880
Over All Mean			3.86		3.96		3.85		**3.89**	

The participants' agreement about the lack of patient necessary information as the third common cause of the prescribing errors with the overall mean of 3.89.The nurses agreement is more than the doctors and pharmacists with the mean of 3.96.

Table 10: Causes of the Medication Prescribing Errors

Causes	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
System and Supervision	1	Lack of proper error reporting system.	3.91	.933	4.15	1.224	3.91	.982	3.99	1.062
	2	Poorly developed pharmacy services.	3.91	.730	4.08	1.001	3.91	1.053	3.97	.943
	3	Lack of health administration supervision.	3.59	.876	3.76	1.325	3.51	1.004	3.62	1.094
	4	Lack of awareness about the current prescribing error incidence.	3.59	1.152	4.10	.990	3.81	.961	3.84	1.040
	5	Poorly developed prescription system.	3.94	.624	4.05	.932	4.04	.986	4.01	.865
Over All Mean			3.79		4.03		3.84		**3.89**	

The participants 'agreement about the lack of system and supervision as the third common cause of the prescribing errors with the overall mean of 3.89.The nurses agreement is more than the doctors and pharmacists with the mean of 4.03.

Table 11: Causes of the Medication Prescribing Errors

Causes	N	Statements	Doctors		Nurses		Pharmacists		Overall mean	
			M	SD	M	SD	M	SD	M	SD
Prescriber Lapse, slip	1	Lack of medication order double-checking.	3.81	.755	4.08	.911	3.53	.910	3.81	.897
	2	Using abbreviation instead the full name.	3.74	.890	3.69	.832	4.37	.759	3.93	.881
	3	Doctor didn’t check allergic section.	3.96	.796	4.24	1.084	4.21	.646	4.14	.899
	4	Confusing between brand and generic name.	3.30	.940	3.88	1.126	3.61	.775	3.60	.988
Over All Mean			3.70		3.97		3.93		**3.87**	

The participants' agreement about the prescriber lapse and slip as the fourth common cause of the prescribing errors with the overall mean of3.87.Thenurses'agreement is more than the doctors and pharmacists with the mean of 3.97.

The participants agree about the unintentional mistakes as a first common type of the prescribing errors with the overall μ=3.81.The nurses' agreement is more than the doctors and pharmacists with the μ=3.86. The participants also agreed about the intentional violation mistakes as second type of the prescribing errors with the overall μ=3.75. The pharmacists agreement is more than

the doctors and pharmacists with the μ=3.77. The participants' agreement about the intentional mistakes as a third common type of the prescribing errors with the overall mean of 3.68. The nurses' agreement is more than the doctors and pharmacists with the mean of 3.85.This finding is consistent with other studies[1,6,9,19,20].also consistent with study reported that more than 46% of prescriptions were incomplete on direction for use, more than 22% of prescriptions were not having the dose information, and more than 23% of prescriptions with omitted the dose of prescribed drug[25]. Other studies reported that the common types of the prescription errors are: wrong patient, drugs contraindication, wrong drug , wrong dose or frequency, wrong formulation, wrong route of administration, unclear orders on prescriptions[16,10].This finding is contradict with other studies which showed three types of written reports of incidents: prescribing, dispensing near misses, and dispensing[13].Generally, the causes of the medication prescribing errors are multidisciplinary (physicians, nurses and the pharmacists)as reported by other studies in the literature[18,26].The participants' agreement about the staff variables(incorrect instruction, lack of communication and few numbers of the health staff)are the first common cause of the prescribing errors with the overall mean of 3.93. The nurses' agreement is more than the doctors and pharmacists with the mean of 3.99.The participants' agreement about the lack of knowledge regarding the drug therapy and environmental conditions(high workload and time pressure)as the second common cause of the prescribing errors with the overall mean of 3.90.The participants' agreement about the lack of patient necessary information (lack of proper documentation regarding the patients medication and using the patient as only source of the information)as the third common cause of the prescribing errors with the overall mean of 3.89.Thenurses'agreement is more than the doctors and pharmacists with the mean of 3.96.The participants agreed about the lack of system(poorly developed prescription system, poorly developed reporting system) and lack of supervision as the third common causes of the prescribing errors with the overall mean 3.89.Thenurses'agreement is more than the doctors and pharmacists with the mean of4.03.The participants agreed about the prescriber lapse and slip(forget check the allergic section and the using the abbreviation instead the drugs full names) as the fourth common causes of the prescribing errors with the overall mean of 3.87.The nurses agreement is more than the doctors and pharmacists with the mean of 3.97.This finding is consistent with other study [1,14,21,22,23,24.]which reported that there were a lot of the risk factors identified included individual, team, environment, and task factors. Therefore, the most common cause was the lack of knowledge regarding the pharmacological drugs. showed that the most common cause was illegible prescription orders that represent (26.2 %)[11].in South Korea

reported that the administration of drugs without checking was the most common cause of the prescribing errors[8]. The result of the study is also contradict those reported that the different route of administration represent a considerable factor associated with increase the prescribing medication errors[20].

RECOMMENDATION

For physician

Must consider specific patient data when ordering or prescribing the medication. Take an extra time on order that have the potential to cause the greatest harm to patient. Double check the final order before passing it to the patient. Spelling the name out when it necessary and avoiding drugs abbreviation. Writing or typing the proper Latin terms to avoid lapse. Must take more information from the family of the patients (no depend only on the patient as a source of information). Maintain a good communication with those who supply and administer medicine.

For Hospital Administration

Apply an effective system to communicate the mistake, computerized physician order entry(CPOE), computerized clinical decision support system(CDSS), electronic medical record.

Introduction of non-punitive (blame free)error reporting system to facilitate medication errors reporting for further study and analysis.

Introduction of residents training programs about proper medication prescribing skills. Establishment of hospital wide medication safety programs. Demonstrate an errors feedback system. Must regulate the working times for the physician to reduce the stress and the time stress, which affect and increase the numbers of the medication prescribing errors. Increase the numbers of the health staff who aid to reduce the errors and educate the patients. Alternatively, contract with the other health workers to clarify and resolve the errors of prescribing.

For Patient

Patient must check the medication before using them. Patient must declare if they have any health problems or any sensitivity to the drugs.

For Authority and Drugs Companies

Regulatory authority should be willing to change the name of drugs if cross occur. Pharmaceutical regulatory process should be streamlined and improved. The drug authority must supervise the illegible drugs prescribing.

CONCLUSION

These finding are the first to document the types and the causes of medication prescribing errors

in Yemen. The researchers found that the unintentional mistakes as a first common type of the prescribing errors, intentional violation mistakes as second type of the prescribing errors and the intentional mistakes as a third common type of the prescribing errors. The most common causes reported in this study are the health staff (incorrect instruction about the drugs and lack of communication with the doctor who prescribe the drugs and few numbers of the health assistant staff as a first common cause, lack of knowledge and environmental condition as the second common cause, lack of patient necessary information and lack of system and supervision are the third common cause, prescriber lapse and slip as the fourth common cause. Future study should explore the prevalence rate of the medication prescribing an errors and evaluate the strategies that prevent the future prescribing errors

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