

Clinical Outcomes of Drug-related Problems in Saudi Arabia: Patients' and Healthcare Providers' Perspective

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Abstract

Purpose: To explore the patients and healthcare providers' attitudes and perceptions on clinical outcomes drug-related problems in Saudi Arabia. **Methods:** It is a 4-months cross-sectional survey of drug-related problem information in Saudi Arabia. The study consisted of two-part a demographic data. The second part contained the questions about the frequent occurrence of drug-related problems, the type of medication-induced those problems, and the drug-related problem clinical consequences and outcomes. American Society of Health-System Pharmacist definitions of drug-related problems used. The 5-point Likert response scale system used. The survey distributed through social media. The questionnaire made of an electronic format, and it analyzed through survey monkey system. **Results:** The total responders were two hundred and one; the Saudi nationality was 188 (93.5%), and non-Saudi was 13 (6.5%) patient. The gender distribution was female 180 (89.6%), and the male was 21 (10.4%). The majority of them in age (18-44) 88% and located in Riyadh region 84 (41.8%) and Asir region 59 (29.4%). Of those 44 (22.1 %) were healthcare providers. The responders showed a high percentage of drug-related problem consequences and outcomes; drug-related problem lead to pharmacy visit was 59 (29.5%), additional tests were 47 (24.35%), ambulatory care clinic visit was 76 (38.4%), and an emergency visit was 43 (21.4%). The hospital admission was 46 (23.1%), general surgery 24 (11.9%), critical care admission was 24 (12.1%), and drug-induced death was 48 (24.12%). The most frequent drug-related problems occurred with the patient last year at least once; it was drug noncompliance 142 (71.4%), indications without medication 100 (50%), and adverse medication events 80 (40%). The most type of medicines induced the problems were Antibiotics, the drugs for pain, and dermatology drugs. **Conclusion:** Clinical outcome of drug-related problems occurred was potential. Clinical pharmacy services with emphasis to a drug-related program of antibiotics, painkiller dermatology medications are necessary. Moreover, to patient counseling program in health institutions and public awareness of medications is required in Saudi Arabia.

Key words: Clinical outcomes, Drug-related problems, Patients, Healthcare providers, Perspective, Saudi Arabia.

INTRODUCTION

The pharmacist provides pharmaceutical care on the regular basis that is to the particular best clinical outcome, improve patient quality of life, and prevent drug-related problems.^[1] The drug-related problems consisted of eight problems according to American Society of Health-System Pharmacist.^[1-2] It included adverse drug reaction, medications errors, a drug without indication, failure to receive medication, indicators without medications, drug interaction, drug noncompliance, and drug poisoning. Several international and local studies conducted to measure the complications outcomes of those problems. That has included a visit the doctor at ambulatory care clinic or emergency visit, hospital admission, or critical care admission or death.^[3-11] Most of the studies done retrospective or perspective with follow up. There's not involved the patient respective and view. The investigator not familiar with studies discussed the clinical outcome of drug-related problems with healthcare professionals and patient perspectives. The objective of the study to explore the extent and the complications of drug-related problems with the healthcare professionals and patient perspective in Kingdom of Saudi Arabia.

METHOD

It is a 4-months cross-sectional survey of drug-related problem information in Saudi Arabia. The survey consisted of two-part demographic information, and second part consisted of thirteen questions focusing on general knowledge of drug-related problems, their occurrence, and costs. The questions divided into three domains. It included domain 1: Primary or essential information about knowledge and perception of drug-related problems, domain 2: The cost analysis of drug-related problems, domain 3: Clinical outcome of drug-related problems. The questions about the frequent occurrence of drug-related problems, the type of medication-induced those problems, and the drug-related problem clinical consequences and outcomes. American Society of Health-System Pharmacist definitions of drug-related problems used.^[1-2,12-13] The 5-point Likert response scale system used. The questions were open and closed-ended. The survey distributed through social media around Saudi Arabia. The survey distributed through social media by using what's App to almost two thousand public and healthcare professionals overall Kingdom of Saudi Arabia. A messages reminders sent to healthcare professional after two weeks, and additional messages reminders sent to

healthcare professional after four weeks. The survey made an electronic format, and it analyzed domain three Clinical outcomes of drug-related problems through survey monkey system.

RESULTS

The total responders were one hundred and one. Of those 155 (77.9%) were patients while 44 (22.1%) were healthcare professionals. Of those, the Saudi nationality was 188 (93.5%), and non-Saudi was 13 (6.5%). It is statistically significant in Saudi and non-Saudi between these patient and healthcare professionals. The patients were high in the Saudi nationality while with healthcare professionals higher in the non-Saudi nationality. The gender distribution was female 180 (89.6%), and the male was 21 (10.4%). It is statistically non-significant ($p < 0.5$) in the in the female and males between Patient and healthcare professionals. The most age was (18-44) represented the eighty-eight percent of responders. There is no statistically significant between all age categories between patient and healthcare professionals expert in the age (18-29) years. The complete most healthcare professionals were pharmacist 34 (65.38%), and nurses were six (11.54%) followed by others 5 (9.62%), dentist 4 (7.69%) and 3 (5.77%) physicians. The most responders' qualifications had the Bachelor Degree 137(68.2%). Followed by High school 30 (14.9%) and Master degree 18 (9%). There is no statistically significant difference in the academic qualifications between patient and healthcare professionals ($p < 0.5$) as explored in Table 1. The most type of medications had drug-related problems used was antibiotics, others medications, painkiller medications, and Skin medications. There is statistically differences of type of medications Antidiabetics, Antihypertension, the extent of occurrence and what to do toward the problems (Adverse drug reaction, Medications errors, Drug noncompliance, drug interaction) occurred between patients and healthcare professional ($p < 0.05$). Others drug-related problems included indication without medications, drug poisoning, medication without indication none statistically differences between patients and healthcare professional ($p < 0.05$) as explored in Table 2. The responders showed a high percentage of drug-related problem consequences and outcomes; drug-related problem lead to ambulatory care clinic visit was 76 (38.4%), pharmacy visit was 59 (29.5%), additional tests were 47 (24.35%), and drug-induced death was 48 (24.12%). Followed by an emergency visit was 43 (21.4%), the hospital admission was 46 (23.1%), critical care admission was 24 (12.1%), and general surgery 24 (11.9%) as explored in Table 2. The most frequent drug-related problems occurred with the patient last year at least once; it was drug noncompliance 142 (71.4%), indications without medication 100 (50%), and adverse medication events 80 (40%). There are no statistical differences in drug-related problems clinical outcomes between patients and healthcare professional ($p > 0.05$). There is a statistical difference of a knowledge of what to do toward the problems (Medications errors, Drug poisoning, drug interaction, indication without medications) occurred between patients and healthcare professional ($p < 0.05$) as explored in Table 3. The most drug-related problems lead to visit the doctor at ambulatory care clinic was the adverse drug reaction 44 (22.2%) and drug non-compliance 29 (14.65%), while the most problem leads to the laboratory requisition were drug poisoning 19 (9.84%) and adverse drug reaction 17 (8.81%). The most problem lead to pharmacy visit were adverse drug reaction 25 (12.5%) and medications without indication 15 (7.5%) and indication without medications 15 (7.5%). The most problems induced the emergency visit or hospital admission or surgery were drug poisoning 28 (13.93%) and medication errors 14 (6.97%) while the problems induced hospital admission were drug poisoning 25 (12.56%) and medication errors 19 (9.55%). The most problems need surgery were drug poisoning 18 (8.96%) and medication errors 13 (6.47%). The most problem lead to critical care admission were drug poisoning 18 (9.05%) and drug interaction 15 (7.54%) while problems lead to death medications errors 21 (10.55%) and drug poisoning 13 (6.53%) as explored in Table 4.

DISCUSSION

The general administration of pharmaceutical care within strategic pharmacy plan Established several programs to prevent the complication of drug-related problems.^[14] That has included medication safety program, pharmacist intervention, participated with therapeutic guidelines and protocols, participated with hotline call center with national drug information centers, and implementation of Saudi Center of healthcare organization with patient safety requirements.^[15-18] The investigator tried to investigate the Magnitude of the drug-related problem with healthcare professionals and patient perspectives. The finding of the study showed the complication and the sequence of outcomes of drug-related problems were ambulatory care visit because of it is straightforward to access by the patient especially the private clinic. Also, it very cheap with or without healthcare insurance coverage. The patients might visit the pharmacy if any of drug-related problems occurred with them. It was first one to contact the patient might prefer the ambulatory care clinic than the pharmacy that's may more trustworthy on the physician than the pharmacist and more gaining knowledge of drug-related problems. Moreover, maybe the patient visited the ambulatory care clinic for treatment or need any additional laboratory tests. The finding showed the second higher percentage of drug-related problems complications lead to death than an emergency visit or hospital admission or critical care admission. That has related the imperfect knowledge, and misuse of some medications or non-adherence of medications lead to disease complications and sequencing death. The finding showed there is no statistically significant difference between the patients and healthcare providers. That is maybe their practice as same as of both lifestyles behavior and perception toward the drug-related problems. The results of drug-related problems lead to emergency visit almost resemble what reported by Al-Arifi, M *et al.* and higher than what reported by Al-Olah, YH *et al.*^[7,19] While the hospital admission is resembled what reported by Nivya, K *et al.* but higher than what reported by Al-Arifi, M *et al.* that is due to increasing of percentage over the past several years, and patient perspective higher that what documented in the patient profile.^[7,20] The drug-related problems lead to critical admission percentages higher than what reported by Hammerman, H. *et al.* because our study more general not focused at one area of medicines, poor implementation of patient education programs at healthcare organizations, and reduced background on medications knowledge.^[11] The most medications induced drug-related problems with all patient and healthcare professionals were antibiotics with a high rate of non-compliance and not completed the course of the therapy and prescribing or administration by healthcare professionals. Also, the painkillers and dermatology medications the second one that is due some patient taking medications for common pain like headaches or muscular pain or cosmetic medications. Those may induce adverse drug reaction. There are no statistically significant differences between patient and healthcare professionals with most of the medications induced drug-related problems except the anti-diabetic or Antihypertensive medications adverse drug reaction, medications errors, drug non-compliance and drug interaction. The healthcare professionals are higher than the patient. That has related the inadequate monitoring of drug-related problems of those medications after prescribing or overprescribing the medications. The adverse drug reaction or non-compliance most problems lead to ambulatory care visit. The most of study site patient refer to the physician if there are straightforward problems like previous problems. The most problems lead the pharmacy visit was adverse drug reaction or medications without indication and indication without medications. That has given us a good impression of the patient and required more information about drug therapy and drug-related problems. The drug poisoning and medication errors were the most problems lead to an emergency visit or hospital admission or perform surgery or death. That finding expected due to the dangers of the problem, and drug poisoning center is not fully working and provided the services to the patients. The clinical outcome of drug-related problems from patient or healthcare

Table 1: Demographic responder qualifications information.						
Characteristics	Patients n (%)	Healthcare Professional's n (%)	Total comparisons n (%)	Total Response n	Total Response %	P value
Sex						
Female	138 (89.03%)	40 (90.91%)	178 (89.45%)	180	89.6%	> 0.05
Male	17 (10.97%)	4 (9.09%)	21(10.55%)	21	10.4%	> 0.05
Answered question	155 (77.89%)	44 (22.11%)	199	201		
Skipped question			2	0		
Nationality						
Saudi	151(97.42%)	35 (79.55%)	186 (93.47%)	188	93.5%	< 0.05
Non-Saudi	4 (2.58%)	9 (20.45%)	13 (6.53%)	13	6.5%	< 0.05
Answered question	155 (77.89%)	44 (22.11%)	199	201		
Skipped question			2	0		
Age						
<18	1 (0.65%)	0 (0.00%)	1 (0.50%)	1	0.5%	> 0.05
18 - 29	80 (51.61%)	33 (75.00%)	113 (56.78%)	113	56.2%	< 0.05
30 - 44	53 (34.19%)	9 (20.45%)	62 (31.16%)	64	31.8%	> 0.05
45 - 59	21 (13.55%)	2 (4.55%)	23 (11.56%)	23	11.4%	> 0.05
60+	0 (00.00%)	0 (00.00%)	0 (00.00%)	0	0.0%	> 0.05
Answered question	155 (77.89%)	44 (22.11%)	199	201		
Skipped question			2	0		
Healthcare providers						
Yes	0 (00.00%)	44 (100.0%)	44 (22.11%)	44	22.1%	< 0.05
Non	155 (100.0%)	0 (00.00%)	155 (77.89%)	155	77.9%	< 0.05
Answered question	155 (77.89%)	44 (22.11%)	199	199		
Skipped question			2	2		
Type of healthcare professional				Response Count	Response Percent	
Physician				3	5.77%	
Dentist				4	7.69%	
Pharmacist				34	65.38%	
Nurse				6	11.54%	
Others				5	9.62%	
Answered question				52		
Skipped question				0		
Academic Qualifications				Response Count	Response Percent	
Doctorate degree	4 (2.58%)	3 (6.82%)	7 (3.52%)	7	3.5%	> 0.05
Master degree	15 (9.68%)	2 (4.55%)	17 (8.54%)	18	9.0%	> 0.05
Bachelor Degree	104 (67.10%)	32 (72.73%)	136 (68.34%)	137	68.2%	> 0.05
Diploma	3 (1.94%)	3 (6.82%)	6 (3.02%)	6	3.0%	> 0.05
High school	26 (16.77%)	4 (9.09%)	30 (15.08%)	30	14.9%	> 0.05
Intermediate School	1(0.65%)	0 (0.00%)	1(0.50%)	1	0.5%	> 0.05
Primary School	1(0.65%)	0 (0.00%)	1(0.50%)	1	0.5%	> 0.05
Not educated	1(0.65%)	0 (0.00%)	1(0.50%)	1	0.5%	> 0.05
Answered question	155 (77.89%)	44 (22.11%)	199	201		
Skipped question			2	0		

Table 2: The extent of medications caused drug related problems

Answer Options	Diabetes medications	Blood pressure medications	Cardiovascular medications	Psychiatric medications	Anti-rheumatoid medications	Dermatology medications	Painkiller medications	Antibiotics	Dental drugs	Anti-asthma medications	Anticoagulant	Gastrointestinal medications	Anticonvulsants	Others	I do not use any medications	Response Count
Medication adverse reaction*	8	4	0	6	4	31	20	38	11	4	0	12	3	31	85	197
Medication errors*	2	3	3	0	3	11	4	15	4	2	1	5	0	16	142	190
Drug poisoning	2	1	1	0	2	0	2	4	0	1	3	4	2	6	169	190
Drug noncompliance*	5	2	1	5	1	26	21	43	14	6	0	18	0	29	76	197
Medication without indications	4	0	1	2	3	5	24	15	10	3	0	7	0	15	128	192
Drug interactions*	4	1	0	0	5	13	27	23	9	1	0	14	0	25	110	194
Indications without medication	4	2	2	1	0	2	6	12	1	4	1	4	0	7	162	195
Total	29	13	8	14	18	88	104	150	49	21	5	64	5	129	872	
answered question																201
skipped question																0

*There is higher statistically differences of type of medications Antidiabetics, Antihypertension problems (Adverse drug reaction, Medications errors, Drug noncompliance, drug interaction) occurred between healthcare professionals and patients (p<0.05)

Table 3: Clinical complications of drug-related problems.

Answer Options	Medication adverse reaction	Medication errors	Drug poisoning	Drug noncompliance	Medication without indications	Drug interactions	Indications without medication	Never	I do not know	Response Count	No of occurrences of DRP	Percentages of occurrences of DRP (%)	
Which of drug related problems have you ever experienced?	59	9	6	60	15	5	23	54	36	199	109	54.77	
Which of drug-related problems you know what to do toward the problems occur? #	67	15	24	46	28	15	26	43	53	196	100	51.02	
Which of drug related problems lead you to visit a doctor at a clinic?*	44	15	14	29	9	13	7	93	29	198	76	38.38	
Which of drug related problems lead you to make laboratory and non-laboratory tests?*	17	12	19	7	3	12	5	112	34	193	47	24.35	
Which of drug related problems lead you to visit the pharmacy?*	25	9	2	13	15	4	15	107	34	200	59	29.50	
Which of drug related problems lead you to Emergency department?*	12	14	28	1	2	11	1	133	25	201	43	21.39	
Which of drug related problems lead you to a hospital admission?*	13	19	25	10	4	9	4	130	23	199	46	23.12	
Which of drug related problems lead you to do surgery?	3	13	18	4	3	9	2	151	26	201	24	11.94	
Which of drug related problems lead you to intensive care unit admission?*	9	12	18	4	5	15	1	150	25	199	24	12.06	
Which of drug-related problems induced death to a family member or friend?*	9	21	13	11	4	8	5	104	47	199	48	24.12	
Which of drug related problems management covers by health insurance?	18	16	12	8	5	8	7	80	91	200	29	14.50	
answered question											201		
skipped question											0		

*There is no statistical differences in drug-related problems clinical outcomes between patients and healthcare professional (p>0.05)

There is statistically differences of a knowledge of what to do toward the problems (Medications errors, Drug poisoning, drug interaction, indication without medications) occurred between patients and healthcare professional (p<0.05)

Table 4: Drug-related Problems Vs. Clinical outcomes.

No	Drug Related Problems outcomes	Medication adverse reaction	Percentages (%)	Medication errors	Percentages (%)	Drug poisoning	Percentages (%)	Drug noncompliance	Percentages (%)	Medication without indications	Percentages (%)	Drug interactions	Percentages (%)	Indications without medication	Percentages (%)	Response Count
1	Visit a doctor at a clinic?*	44	22.22%	15	7.58%	14	7.07%	29	14.65%	9	4.55%	13	6.57%	7	3.54%	198
2	Request laboratory and non-laboratory tests?*	17	8.81%	12	6.22%	19	9.84%	7	3.63%	3	1.55%	12	6.22%	5	2.59%	193
3	Visit the pharmacy	25	12.50%	9	4.50%	2	1.00%	13	6.50%	15	7.50%	4	2.00%	15	7.50%	200
4	Visit Emergency department?*	12	5.97%	14	6.97%	28	13.93%	1	0.50%	2	1.00%	11	5.47%	1	0.50%	201
5	Hospital admission?*	13	6.53%	19	9.55%	25	12.56%	10	5.03%	4	2.01%	9	4.52%	4	2.01%	199
6	Perform a surgery?	3	1.49%	13	6.47%	18	8.96%	4	1.99%	3	1.49%	9	4.48%	2	1.00%	201
7	Intensive care unit admission?*	9	4.52%	12	6.03%	18	9.05%	4	2.01%	5	2.51%	15	7.54%	1	0.50%	199
8	Death of a family member or friend?*	9	4.52%	21	10.55%	13	6.53%	11	5.53%	4	2.01%	8	4.02%	5	2.51%	199

*There is no statistical differences in drug-related problems clinical outcomes between patients and healthcare professional (p>0.05).

perception reflected the reality of drug-related problems. That needs very comprehensive effort to prevent the problems in the future and involved the significant role of the pharmacist in preventing them. Most of the results could not compare with other studies due to hard to find studies discussed the complications of drug-related problems at one publication and maybe the first investigation about this issues.

CONCLUSION

The complication of drug-related problems with patient and healthcare professionals perception is the almost the same what has investigated previously. Drug-related problems monitoring with public education is necessary at Ministry of Health hospitals in Kingdom of Saudi Arabia.

ACKNOWLEDGMENT

None.

CONFLICT OF INTEREST

None

ABBREVIATIONS

KSA: Kingdom of Saudi Arabia; ASHP: American Society of Health-System Pharmacist; MOH: Ministry of Health; USA: United States of America.

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