Perception of Pharmacists About the High-Risk/Alert Medications in Saudi Arabia

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ABSTRACT

Objectives: To demonstrate the perception of pharmacists about the High-Risk/Alert medications in Saudi Arabia. **Methods:** It analyzes a cross-sectional survey that discussed the perception of pharmacists about High-Risk/Alert medications in Saudi Arabia. The survey consisted of respondents' demographic information about pharmacists and The Perception of High-Risk/Alert Medications, barriers, which factors may Discourage you from implementing High-Risk/Alert medications, and recommendations/suggestions for facilitating the implementation of High-Risk/Alert medicines. The 5-point Likert response scale system was used with closed-ended questions. The survey was validated through the revision of expert reviewers and pilot testing. Besides, various tests of reliability, McDonald's ω, Cronbach alpha, Gutmann's λ2, and Gutmann's λ6, were done with the study. In addition, the data analysis of the Perception of Pharmacists About the High-Risk/Alert Medications in Saudi Arabia is done through the survey monkey system. Besides, the statistical package of social sciences (SPSS), Jeffery's Amazing Statistics Program (JASP), and Microsoft Excel sheet version 16. **Results:** A total number of 442 pharmacists responded to the questionnaire. Of them, more than one-third responded from the Central region (183 (40.40%)), and one Quarter responded from the Western part (119 (26.92%)), with statistically significant differences between the provinces (p=0.000). Males responded more than females (264 (59.59%)) versus 179 (40.41%)), with statistically significant differences between all levels (p=0.000). Most of the responders were in the age group of 24-30 years (266 (59.91%)) and 31-35 years (78 (17.57%)), with statistically significant differences between all age groups (p=0.000). Most of the pharmacists were staff pharmacists (323 (72.75%)) and pharmacy supervisors (56 (12.61%)), with statistically significant differences between all levels (p=0.000). The average score of perception of pharmacists about High-Risk/Alert medications was (3.88). The element "Staff compliance with protocols, guidelines and order sets related to high-alert medications is required" obtained the highest score (4.38). The pharmacists believe that Standard protocols, order sets, and orders express IV and neuraxial high-alert medication infusions/doses are highly recommended (4.36). The average score for the element "Factors Discourage you to implement High-Risk/Alert medications" was (3.36). The highest score from the component "The High-Risk/Alert medications are of a serious nature" was (3.92). The score for the element "Lack of Periodic training of pharmacy staff about High-Risk/Alert medications " was (3.83), and "Low level of clinical knowledge of High-Risk/Alert medications "was (3.70). The most recommendations/suggestions for facilitating the implementation of High-Risk/Alert medications were the Implementation of an electronic high-alert medications system 385(88.30%), setup up the therapeutic protocol or guidelines for High-Risk/Alert medications 347 (79.59%), and standardizing the prescribing, preparation, dispensing and administration of High-Risk/Alert drugs 345 (79.13%). **Conclusion:** The pharmacist attributed High-Risk/Alert medications as appropriate. Therefore, targeting periodic education and training. Besides, improving clinical knowledge and implementing an electronic High-Risk/Alert medications system are highly suggested to improve patient outcomes and avoid drug-related disorders at healthcare facilities in Saudi Arabia.

Keywords: Pharmacist, Perception, High-risk, Alert, Medications, Drugs.

INTRODUCTION

Medical errors contributed to the significant the 3rd cause of death in the United States of America.[1] The drug-related disorder consists of medication errors, adverse drug reactions, drug poisoning, medication non-compliance, drug without indication, and indications without medication.[2,3] Drug-related problems implicate a high economic burden on the healthcare system locally and internationally.[4-6] Various quality management tools assess the reasons for drug-related issues, emphasizing medication errors. For instance, root causes analysis and fish boon analysis.[7] Multiple causes of medication errors occur, such as poor clinical knowledge, unawareness of healthcare facility policy and procedures, and using non-electronic prescribing and dispensing medication.[8-11] Besides, properly poor perception or attitude toward medication errors. Again, it could be some barriers to implementing an appropriate system of medicine problem prevention.[8-11] The various types of medications contributed

to the error. One of the serious drugs is called High-Risk/Alert medication.[12,13] The mistake of those medications might cause hazardous consequences to patients and the healthcare system. Few studies discussed the perception or barriers to High-Risk/Alert medication system development.[14-16] The current research with cross-sectional about pharmacist perception of high risks medication in Saudi Arabia

METHODS

It analyzes a cross-sectional survey that discussed perception of pharmacists about the high-Risk/Alert medications in Saudi Arabia. It self-reported an electronic survey of the pharmacist, including pharmacists from internship to consultant, pharmacist specialties, and Saudi Arabia. All non-pharmacist or students, non-completed, non-qualified surveys will be excluded from the study. The survey consisted of respondents' demographic information about pharmacists and The Perception of High-Risk/Alert Medications, barriers, which factors may Discourage you from implementing High-Risk/Alert medications, and recommendations/suggestions for facilitating the implementation of High-Risk/Alert medicines. The 5-point Likert response scale system was used with closed-ended questions. According to the previous litterateur with an unlimited population size, the sample was calculated as a cross-sectional study, with a confidence level of 95% with a z score of 1.96 and a margin of error of 5%, a population percentage of 50%, and drop-out rate 10%. As a result, the sample size will equal 380-420 with a power of study of 80%.[17-19] The response rate required for the calculated sample size is at least 60-70 % and above.[19,20] The survey was distributed through social media of what's applications and telegram groups of pharmacists. The reminder message had been sent every 1-2 weeks. The survey was validated through the revision of expert reviewers and pilot testing. Besides, various tests of the reliability of McDonald's ω, Cronbach alpha, Gutmann's λ2, and Gutmann's λ6 were done with the study. The data analysis of the Pharmacist's perception of High-Risk/Alert Medications is done through the survey monkey system. Besides, the statistical package of social sciences (SPSS), Jeffery's Amazing Statistics Program (JASP), and Microsoft Excel sheet version 16. It included a description and frequency analysis, good of fitness analysis, correlation analysis. Besides, inferential analysis of factors affecting the perception of pharmacists about the high-Risk/Alert medications and linear regression. The STROBE (Strengthening the reporting of observational studies in epidemiology statement: guidelines for reporting observational studies) guided the reporting of the current study.[21,22]

RESULTS

A total number of 442 pharmacists responded to the questionnaire. Of them, more than one-third responded from the Central region (183 (40.40%)), and one Quarter responded from the Western part (119 (26.92%)), with statistically significant differences between the provinces (p=0.000). Most of the responders were from MOH Hospitals (157 (35.36%)), with a statistically significant difference between working sites (p=0.000). Males responded more than females (264 (59.59%)) versus 179 (40.41%)), with statistically significant differences between all levels (p=0.000). Most of the responders were in the age group of 24-30 years (266 (59.91%)) and 31-35 years (78 (17.57%)), with statistically significant differences between all age groups (p=0.000). Most of the pharmacists were staff pharmacists (323 (72.75%)) and pharmacy supervisors (56 (12.61%)), with statistically significant differences between all levels (p=0.000). Most of the responders held Bachelor in pharmacy (1214 (48.20%)), and Pharm D (193 (43.47%)). Most pharmacists had a work experience of 1-3 years (125 (28.28%%)) and >1 year (99 (22.40%)), with a statistically significant difference between years of experience (p=0.000). Most pharmacists works at inpatient pharmacy (110 ((26.76%)) and outpatient (88 ((21.41%)) with statistically significant differences between all levels (p=0.000). There was a strong positive correlation between age (years) and years of experience based on Kendall's tau_b (0.744) and Spearman's rho (0.827) correlation coefficients, with a statistically significant difference between the two factors (p<0.000). There was a medium negative correlation between age (years) and current positions based on Kendall's tau_b (0.429) and Spearman's rho (0.474) correlation coefficients, with a statistically significant difference between them (p<0.000). There was a medium positive correlation between the site of work and current practice area based on Kendall's tau_b (0.322) and Spearman's rho (0.404), with a statistically significant difference between the two factors (p<0.000). There was a medium negative correlation between the site of work and years of experience based on Kendall's tau_b (0.323) and Spearman's rho (0.407), with a statistically significant difference between the two factors (p<0.000) (Tables 1 and 2).

The average score of perception of pharmacists about High-Risk/Alert medications was (3.88). The element "Staff compliance with protocols, guidelines and order sets related to high-alert medications is required" obtained the highest score (4.38). The pharmacists believe that Standard protocols, order sets, and orders express IV and neuraxial high-alert medication infusions/doses are highly recommended (4.36). In contrast, the lowest score was obtained for the element "The High-Risk/Alert medications system should be optional and paid " (3.26). The score for the element "I think there is under-working in High-Risk/Alert medications in the healthcare institutions " was (3.46) with a statistically significant difference between the responses (p<0.000). All aspects of the perception of pharmacists about High-Risk/Alert medications were statistically significant between responses (p<0.000) (Table 3). The average score for the element "Factors Discourage you to implement High-Risk/Alert medications" was (3.36). The highest score from the component "The High-Risk/Alert medications are of a serious nature" was (3.92). The score for the element "Lack of Periodic training of pharmacy staff about High-Risk/Alert medications " was (3.83), and "Low level of clinical knowledge of High-Risk/Alert medications "was (3.70). In contrast, low scores were obtained for the elements "The High-Risk/Alert medications sciences is too trivial to work " (2.13), "Consider it the doctor's responsibility " (2.71), and "Lack of confidence in discussing the High-Risk/Alert medications with the physician" (3.15), with statistically significant difference between the responses (p<0.000). All responses about aspects of perception of Factors that affected Factors Discourage you from implementing High-Risk/Alert medications were statistically significant (p<0.000) (Table 4). The most recommendations/suggestions for facilitating the implementation of High-Risk/Alert medications were the Implementation of an electronic high-alert medications system 385(88.30%), setup up the therapeutic protocol or guidelines for High-Risk/Alert medications 347 (79.59%), and standardizing the prescribing, preparation, dispensing and administration of High-Risk/Alert drugs 345 (79.13%) (Table 5). The score for single-test reliability analysis of McDonald's ω was 0.900, Cronbach's α was 0.903, Gutmann's was λ2, 0.913, Gutmann's λ6 was 0.939, and Greater Lower Bound was 0.965 with statistically significant (p<0.05).

Factors affecting the perception of pharmacists about High-Risk/Alert medications

Factors affecting the perception were analyzed. We adjusted the significant values using the independent samples Kruskal–Wallis test and

Table 1: Demographic, social information.

Nationality	Response Count	Response Percent	*p*-value (X2)
Central area	183	41.40%	0.000
North area	31	7.01%	
South area	45	10.18%	
East area	64	14.48%	
West area	119	26.92%	
Answered question	**442**		
Skipped question	**2**		
Site of work	**Response Count**	**Response Percent**	**p-value (X2)**
MOH Hospitals	157	35.36%	0.000
Military hospitals	34	7.66%	
National Guard Hospital	33	7.43%	
Security forces hospitals	5	1.13%	
University Hospital	22	4.95%	
MOH primary care centers	11	2.48%	
Private hospitals	50	11.26%	
Private ambulatory care clinics	5	1.13%	
Private primary healthcare center	2	0.45%	
Community pharmacy	81	18.24%	
Pharmaceutical company	19	4.28%	
Academia	3	0.68%	
King Faisal Specialist Hospital and Research Center	5	1.13%	
SFDA	5	1.13%	
Royal Commission	1	0.23%	
Non employed	1	0.23%	
Intern	10	2.25%	
Answered question	**444**		
Skipped question	**0**		
Gender	**Response Count**	**Response Percent**	
Male	179	40.41%	0.000
Female	264	59.59%	
Answered question	**443**		
Skipped question	**1**		
Age	**Response Count**	**Response Percent**	
24-30	266	59.91%	0.000
31-35	78	17.57%	
36-40	46	10.36%	
41-45	28	6.31%	
46-50	16	3.60%	
> 50	10	2.25%	
Answered question	**444**		
Skipped question	**0**		

Table 2: Demographic, social information.

Pharmacist Qualifications	Response Count	Response Percent	*p*-value (X2)
Diploma in Pharmacy	2	0.45%	
Bachelor in Pharmacy	214	48.20%	
Master	63	14.19%	
Pharm D	193	43.47%	
Ph. D	8	1.80%	
PGY 1	16	3.60%	
PGY 2	10	2.25%	
PGY 3	3	0.68%	
Fellowship	3	0.68%	
Answered question	**444**		
Skipped question	**0**		
Position Held	**Response Count**	**Response Percent**	
Director of Pharmacy	44	9.91%	0.000
Assistant Director of Pharmacy	12	2.70%	
Supervisor	56	12.61%	
Pharmacy staff	323	72.75%	
Pharmacy intern	9	2.03%	
Answered question	**444**		
Skipped question	**0**		
Years of experience in the pharmacy career	**Response Count**	**Response Percent**	
Less than one year	99	22.40%	0.000
1-3	125	28.28%	
4-6	76	17.19%	
7-9	46	10.41%	
10-12	25	5.66%	
>12	71	16.06%	
Answered question	**442**		
Skipped question	**2**		
The practice area	**Response Count**	**Response Percent**	
Inpatient Pharmacy	110	26.76%	0.000
Outpatient Pharmacy	88	21.41%	
Satellite Pharmacy	2	0.49%	
Narcotics and Controlled	5	1.22%	
Extemporaneous Preparation	2	0.49%	
Clinical Pharmacy	59	14.36%	
Inventory Control	9	2.19%	
Drug Information	19	4.62%	
IV admixture	11	2.68%	
Community pharmacy	66	16.06%	
Pharmacy administrations	6	1.46%	
Pharmaceutical company	18	4.38%	
Drug Regulation administration	6	1.46%	
Medication safety	3	0.73%	
Pharmacy intern	1	0.24%	
All hospital pharmacy area	5	1.22%	
Academia activities	1	0.24%	
Answered question	**411**		
Skipped question	**33**		

Table 3: The Perception of High-Risk/Alert medications.

No	Item	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree		Total	Weighted Average	*p*-value (X2)
1	The system in my hospital, including policy and procedure, is good at minimizing the occurrence of Medication Errors (MEs) in High-Risk/Alert medications	4.84%	21	6.45%	28	20.05%	87	44.24%	192	24.42%	106	434	3.77	0.000
2	The setup of the High-Risk/Alert medications system has led to positive changes	3.68%	16	2.07%	9	19.77%	86	46.44%	202	28.05%	122	435	3.93	0.000
3	The hospital promotes itself as an organization that responds to High-Risk/Alert medications discrepancies and other safety-related issues	6.21%	27	5.52%	24	29.66%	129	38.62%	168	20.00%	87	435	3.61	0.000
4	I think there is an under-working of High-Risk/Alert medications in the healthcare institutions	3.91%	17	14.25%	62	30.57%	133	34.94%	152	16.32%	71	435	3.46	0.000
5	I feel comfortable asking for help or support from my colleagues or peers concerning High-Risk/Alert medications	3.23%	14	2.54%	11	16.86%	73	45.96%	199	31.41%	136	433	4.00	0.000
6	I have the opportunity to discuss and receive feedback about my work performance with other staff	4.37%	19	3.91%	17	20.23%	88	47.59%	207	23.91%	104	435	3.83	0.000
7	High-Risk/Alert medications should be mandatory	1.62%	7	2.08%	9	9.93%	43	33.26%	144	53.12%	230	433	4.34	0.000
8	The High-Risk/Alert medications system should be optional and paid	12.90%	56	12.67%	55	29.26%	127	26.27%	114	18.89%	82	434	3.26	0.000
9	It is a good idea for all institutions to have the staff surveyed every 1 to 2 years to assess the organization's safety culture of High-Risk/Alert medications; the findings are used to advance the organization's safety culture.	2.08%	9	2.54%	11	14.78%	64	43.42%	188	37.18%	161	433	4.11	0.000
10	I sometimes worry about dealing with High-Risk/Alert medications in the practice	2.99%	13	7.59%	33	18.16%	79	43.22%	188	28.05%	122	435	3.86	0.000
11	I always need my colleagues to make double checking during the deal with High-Risk/Alert medications	2.08%	9	5.08%	22	18.94%	82	38.57%	167	35.33%	153	433	4.00	0.000
12	If I am under stress; I do not want to deal with High-Risk/Alert medications	4.16%	18	16.40%	71	25.17%	109	33.03%	143	21.25%	92	433	3.51	0.000
13	Standard protocols, order sets, and orders expressing IV and neuraxial high-alert medication infusions/doses are highly recommended	1.15%	5	0.46%	2	10.57%	46	37.01%	161	50.80%	221	435	4.36	0.000
14	Staff compliance with protocols, guidelines, and order sets related to high-alert medications is required	1.15%	5	0.69%	3	11.32%	49	32.79%	142	54.04%	234	433	4.38	0.000
	Answered											435		
	Skipped											9		

Table 4: Perception of barriers or factors may discourage the implementation of High-Risk/Alert medications.

No	Item	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree		Total	Weighted Average	p-value (X2)
1	Low level of clinical knowledge of High-Risk/Alert medications	4.81%	21	10.07%	44	18.99%	83	42.79%	187	23.34%	102	437	3.7	0.000
2	Uncertain association between High-Risk/Alert medications and the drug-related problems	9.17%	40	14.68%	64	25.23%	110	35.55%	155	15.37%	67	436	3.33	0.000
3	The High-Risk/Alert medication sciences are too trivial to work	47.81%	207	19.40%	84	11.32%	49	15.01%	65	6.47%	28	433	2.13	0.000
4	Concern that High-Risk/Alert medications will generate extra work.	8.76%	38	11.75%	51	19.82%	86	40.78%	177	18.89%	82	434	3.49	0.000
5	Expert Pharmacist in High-Risk/Alert medications is not available when needed.	8.70%	38	17.16%	75	28.15%	123	28.60%	125	17.39%	76	437	3.29	0.000
6	Lack of confidence in discussing High-Risk/Alert medications with the physician	11.24%	49	16.97%	74	29.36%	128	30.73%	134	11.70%	51	436	3.15	0.000
7	Lack of time to fill in a report of High-Risk/Alert medications.	5.73%	25	11.24%	49	24.77%	108	38.30%	167	19.95%	87	436	3.56	0.000
8	Unaware of the existence of a national High-Risk/Alert medications system.	5.29%	23	13.10%	57	28.51%	124	35.86%	156	17.24%	75	435	3.47	0.000
9	Did not know how to practice High-Risk/Alert medications.	7.14%	31	15.90%	69	26.96%	117	35.02%	152	14.98%	65	434	3.35	0.000
10	Fear of legal liability.	7.57%	33	10.32%	45	22.48%	98	36.70%	160	22.94%	100	436	3.57	0.000
11	Unaware of the need for a High-Risk/Alert medications system	10.76%	47	18.99%	83	20.14%	88	31.58%	138	18.54%	81	437	3.28	0.000
12	Lack of financial reimbursement.	7.80%	34	10.55%	46	28.44%	124	28.44%	124	24.77%	108	436	3.52	0.000
13	Consider it the doctor's responsibility	18.62%	81	25.75%	112	29.43%	128	18.16%	79	8.05%	35	435	2.71	0.000
14	The negative consequences associated with High-Risk/Alert medications	7.59%	33	10.57%	46	28.05%	122	37.70%	164	16.09%	70	435	3.44	0.000
15	Lack of Periodic training of pharmacy staff about High-Risk/Alert medications	3.89%	17	9.15%	40	15.56%	68	42.79%	187	28.60%	125	437	3.83	0.000
16	The High-Risk/Alert medications are of a serious nature.	2.99%	13	5.29%	23	17.93%	78	44.60%	194	29.20%	127	435	3.92	0.000
17	High-Risk/Alert medications were Not taught probably in pharmacy Schools	6.88%	30	13.53%	59	24.08%	105	31.65%	138	23.85%	104	436	3.52	0.000
	Answered											**437**		
	Skipped											**7**		

Table 5: What are your recommendations/suggestions for facilitating the implementation of High-Risk/Alert medications.

	Responses	
Implementation of an electronic high alert medications system	385	88.30%
Increase the number of pharmacy staff who deal with High-Risk/Alert medications	311	71.33%
Applied the Quality Management standards	317	72.71%
Implement medication safety tools for High-Risk/Alert medications	339	77.75%
Setup up the therapeutic protocol or guidelines for High-Risk/Alert medications	347	79.59%
Standardized the prescribing, preparation, dispensing, and administration of High-Risk/Alert medications	345	79.13%
Standardized policy and procedures for High-Risk/Alert medications	321	73.62%
Increase awareness of high-alert medication	5	1.14%
Monitor the implementation	3	0.68
Answered	**436**	
Skipped	**8**	

the Bonferroni correction for multiple tests. perception of pharmacists about the high-Risk/Alert medications location, worksite, age (years), gender, experience, position held, and practice area in a pharmacy career. All seven factors did not affect the perception of pharmacists about High-Risk/Alert medications with non-statistically significant differences between regions (p>0.05) (Table 6). The relationship between the perception of High-Risk/Alert medicines, such as location, worksite, age (years), gender, years of experience, position held, and practice area in a pharmacy career. The multiple regression analysis considered perception as the dependent variable and factors affecting it as an expletory variable. There was a weak relationship (R=0.119 with p=0.584) between the perception of High-Risk/Alert medications and their factors. All seven factors were non-significant differences in the relationship (p>0.05). The bootstrap model was also confirmed (Table 7).

Factors affecting the Factors barriers may Discourage the implementation of High-Risk/Alert medications

Factors affecting the barriers that may Discourage the implementation of High-Risk/Alert medications were analyzed. We adjusted the significant values using the independent samples Kruskal–Wallis test and the Bonferroni correction for multiple tests. The factors that might affect barriers that may Discourage the implementation of High-Risk/Alert medications include location, worksite, age (years), gender, years of experience, position held, and practice area in a pharmacy career. All seven factors did not affect the perception of pharmacists about barriers that may Discourage the implementation of High-Risk/Alert medications with non-statistically significant differences between regions (p>0.05) (Table 6). The relationship between the barriers may Discourage the implementation of High-Risk/Alert medicines. Factors affecting it include location, worksite, age (years), gender, years of experience, position held, and practice area in a pharmacy career. The multiple regression analysis considered factors of the passing of barriers that may Discourage the implementation of High-Risk/Alert medications as the dependent variable and factors affecting it as an expletory variable. There was a weak relationship (R=0.096 with p=0.820) between the factors barriers that may Discourage the implementation of High-Risk/Alert medications and the factors involving it. All seven factors were non-significant differences in the relationship (p>0.05). The bootstrap model was also confirmed (Table 7).

DISCUSSION

The High-Risk/Alert medication might have implicated serious adverse effects or severe consequences if a mistake occurred. That leads to poor clinical outcome and increase the unnecessary and additional cost of pharmacy services and the healthcare system.[23,24] Therefore, the perception of High-Risk/Alert medication might affect the foundations of plucky procedures at healthcare facilities. If their lousy perception of the healthcare provider's emphasis on the pharmacy staff, that's probably would ignorance might have happened and progress to severe drug misadventures. Besides, sometimes various barriers might prevent the development and implementation of High-Risk/Alert medication if the pharmacist or higher administration does not correct or remove the obstacles that lead to harmful and severe drug-related conditions. The current investigation, with the excellent number of responders and high reliability of the survey, will explore the pharmacist's perception of High-Risk/Alert medication. which better than previous in the sample size and reliability analysis.[14-16] The study's findings showed that the pharmacist's perception of High-Risk/Alert medications is acceptable. The pharmacist believes the pharmacy staff should ensure compliance with order sets of High-Risk/Alert medicines. Besides, the High-Risk/Alert medication dosing protocol of parental administration is recommended. That means the pharmacists are ready to implement all High-Risk/Alert medications and related policies and procedures. In contrast, the pharmacist disagreed that high risk should be optional, or healthcare administrators did not implement the high risk or not enough at healthcare organizations. That means the pharmacists fully support the higher administration to implement a High-Risk/Alert medication system and help them perform well and reduce the incidence of mistakes of high-risk/alert medications.[10,25] Thus, there is no previous investigation to compare with the current findings.

The findings showed that the significant barrier to preventing a High-Risk/Alert medication system at pharmacy practice was a lack of regular education and training about the program.[26] Besides, there was a low level of clinical knowledge of High-Risk/Alert medications, which was a part of inadequate education and training or an unavailable of high caliber and expert pharmacists at their institutions.[26] Therefore, the pharmacist believes High-Risk/Alert medication is serious and part of the pharmacist's job and responsibility to prevent any medication errors.[10,25] Thus, there is no previous investigation to compare with the current findings.

The findings showed the high demand for electronic prescriptions of High-Risk/Alert medications, establishing the therapeutic protocol of High-Risk/Alert medicines. Therefore, besides standardized prescribing, preparation, and dispensing of High-Risk/Alert drugs, it those excellent to start implementing High-Risk/Alert medication in pharmacy services. In addition, various publications suggested standardized total parental nutrition for neonates, pediatrics, and adults.[27-29] Moreover, some authors recommended standardized emergency medications or electrolytes as physician orders and converted them to electronic physician orders.[30-32] Thus, there is no previous investigation to compare with the current findings.

Various factors, including location, working site, age, gender, position held, and many years

Table 6: Multiple regression of Factors with the Perception of High-Risk/Alert medications.

Model		R	R Square	F	Sig.	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
						B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.119 [b]	.014	0.804	.584[b]	3.982	.206		19.370	.000	3.578	4.386		
	Location					.005	.017	.015	.289	.773	-.029	.039	.967	1.034
	Site of work					-.010	.008	-.081	-1.322	.187	-.026	.005	.667	1.500
	Age (years)					.002	.042	.005	.049	.961	-.080	.084	.304	3.293
	Pharmacist gender					.055	.061	.047	.900	.368	-.065	.175	.927	1.079
	Years of experience in a pharmacy career					-.004	.032	-.010	-.108	.914	-.067	.060	.277	3.607
	Position Held					-.045	.034	-.076	-1.305	.193	-.113	.023	.755	1.325
	Practice area					.003	.008	.021	.367	.714	-.012	.018	.794	1.259

a. Dependent Variable: perception of pharmacists about the high-Risk/Alert medications, Predictors: (Constant), Location, Age (years), gender, Years of experience in a pharmacy career, position Held, and practice area.

Bootstrap for Coefficients							
Model		B	Bias	Bootstrap[a]			
				Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	3.982	.000	.179	.001	3.634	4.327
	Location	.005	-2.550E-05	.018	.802	-.033	.039
	Site of work	-.010	-3.511E-05	.008	.170	-.026	.004
	Age (years)	.002	8.704E-05	.035	.943	-.065	.069
	Pharmacist gender	.055	.000	.058	.365	-.058	.169
	Years of experience in a pharmacy career	-.004	.000	.027	.879	-.059	.047
	Position Held	-.045	.000	.032	.170	-.108	.017
	Practice area	.003	7.265E-06	.007	.692	-.010	.017

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 7: Multiple regression of Factors with the barriers may Discourage the implementation of High-Risk/Alert medications.

Model		R	R Square	F	Sig.	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
						B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.096 [b]	.009	0.519	.820[b]	3.733	.271		13.780	.000	3.200	4.265		
	Location					-.005	.023	-.011	-.210	.834	-.049	.040	.966	1.035
	Site of work					.001	.010	.007	.111	.912	-.019	.022	.663	1.508
	Age (years)					-.025	.055	-.041	-.454	.650	-.133	.083	.304	3.292
	Pharmacist gender					-.102	.080	-.066	-1.269	.205	-.259	.056	.930	1.075
	Years of experience in a pharmacy career					-.022	.042	-.049	-.515	.607	-.105	.061	.277	3.613
	Position Held					-.016	.045	-.021	-.358	.721	-.106	.073	.753	1.327
	Practice area					-.005	.010	-.030	-.524	.601	-.025	.015	.794	1.259

a. Dependent Variable: Perception of barriers or factors that may discourage the implementation of High-Risk/Alert medications, Predictors: (Constant), Location, Age (years), gender, Years of experience in a pharmacy career, position Held, and practice area.

Bootstrap for Coefficients							
Model		B	Bias	Bootstrap[a]			
				Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	3.733	.018	.280	.001	3.180	4.323
	Location	-.005	.000	.023	.845	-.051	.039
	Site of work	.001	.000	.010	.903	-.019	.021
	Age (years)	-.025	-.001	.057	.670	-.142	.084
	Pharmacist gender	-.102	-.003	.081	.210	-.261	.051
	Years of experience in a pharmacy career	-.022	.000	.042	.591	-.102	.063
	Position Held	-.016	-.003	.047	.748	-.111	.076
	Practice area	-.005	8.957E-05	.010	.604	-.025	.014

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

of experience, did not affect the pharmacist's perception of High-Risk/Alert medication or did not affect barriers preventing the improvement of High-Risk/Alert medicines. Besides, no dependent factors affect the pharmacist's perception of High-Risk/Alert medication or obstacles preventing the High-Risk/Alert medication implementation. Thus, there is no previous investigation to compare with the current findings

Limitations

The current investigation had higher reliability results and various validation techniques used. Besides, the appropriate calculate sample size and exploring of multiple barriers and recommendations to improve the High-Risk/Alert environmental practice for medication. However, the research had various limitations, including convenience sample techniques, which missed the advantage of sampling to avoid unnecessary bias. The presence of unequal sampling from each demographic information of the responders. Further studies about additional questionnaire elements about High-Risk/Alert medication and using randomized sampling techniques are highly relevant and essential in the pharmacy research of High-Risk/Alert medicines.

CONCLUSION

The pharmacist's perception of High-Risk/Alert medications was beneficial and supportive for improving high-quality performance. The pharmacist believes there is a high demand for standardized protocols for prescription, preparation, and administration stages of drug orders. Besides, the High-Risk/Alert medication is under-working of some High-Risk/Alert medications. The pharmacist lacks periodic education and training about High-Risk/Alert medications and lacks clinical background knowledge. Therefore, the electronic prescription of High-Risk/Alert drugs and electronic therapeutic protocol or guidelines of High-Risk/Alert medicines are highly recommended for implementation in pharmacy practice in Saudi Arabia.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Consent for Publications

Informed consent was obtained from all the participants

Ethical Approval

This research was exempted from research and ethical committee or an institutional review board (IRB) approval.

https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2018/index.html

ABBREVIATIONS

MOH: Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **SPSS:** Statistical Package of Social Sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies in epidemiology statement.

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