Perception of Pharmacists About the Saudi Pharmacist Licensure Exam

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ABSTRACT

Objectives: Researching the perceptions of standardized licensure examinations in the pharmaceutical sector is vital to measure key pharmacy competence and skills assessment of entry-level pharmacists. **Methods:** This cross-sectional descriptive study aimed to explore the perceptions of the Saudi Pharmacist Licensure Exam (SPLE) in improving pharmacy practice in the Kingdom of Saudi Arabia (KSA) by focusing on the experiences and attitudes pharmacy workers had regarding SPLE pharmacy standards and factors associated with passing the exam. **Results:** The data for this study was collected through a survey and analyzed using the survey monkey systems and the statistical package of social sciences (SPSS). The study used a sample size of 701 participants statistically calculated with a 95% CI, 1.96 z score, and 5% margin error. The study found low scores (M=2.77, p=.001) in the perceptions of SPLE in assessing entry-level pharmacists-related skills, attitudes, and knowledge that increase graduates' readiness for pharmacy practice. Location, gender, marital status, age, experience years, income, GPA results, and the number of SPLE admissions affected SPLE perception and passing rates. **Conclusion:** The pharmacist believed that the current Saudi Pharmacy Licensure Examination (SPLE) is required. However, the recent licensure examination does not adequately measure the general pharmacy practice competencies and skills relevant to entry-level pharmacist practice. Furthermore, it was not adequately prepared for clinical pharmacy practice competencies or internal pharmacy board exams. Therefore, it is necessitating targeted keep to dates changes of pharmacy practice in its format to introduce competency standards that measure entry-level skills efficiency continuously.

Keywords: Pharmacist, Perceptions, Competency, Pharmacy, Licensure, Exam, Saudi Arabia.

INTRODUCTION

The traditional understanding of pharmacy as a profession is to support and encourage the safe and responsible use of medications.[1,2] In many nations, this perception has changed over the past few decades, and pharmacists are now seen more as caregivers than drug distributors.[3] Instead of pharmaceutical knowledge that is relevant to the creation of medical products, more emphasis has been placed on pharmaceutical care skills and professional attitudes.[3,4] The idea of pharmaceutical care, the responsible administration of medication therapy to enhance a patient's quality of life, has developed from these patient-centered activities.[3,4] With the changing landscape of pharmacy practice, the idea of pharmaceutical care has included the pharmacist as a care provider, decision-maker, communicator, manager, leader, and teacher.[3,4]

A requirement for establishing efficient pharmaceutical care services would be the hospital pharmacist's increasing participation as an allied health team member and interaction with other medical specialists. Understanding a hospital pharmacist's perspective on the idea of pharmaceutical care, their role in providing direct patient care, and the degree and level of interaction with other healthcare professionals are necessary to implement this service effectively. The conventional responsibilities of a pharmacist have always included managing inventories, purchasing, and assuring the efficacy and safety of medications. However, the traditional job of the

pharmacist has evolved from that of a provider of medicines to one of a giver of patient care, thanks to the development of the "Pharmaceutical care" concept.[3,4]

Certification exams and competence reviews are two assessments for clinical attitudes and abilities frequently used in various contexts in other nations. The objective structured clinical examination (OSCE), a part of the country's performance-based pharmacist licensure test, was introduced by the Pharmacy Examination Board of Canada in 2000. Before participating in the pharmacy clerkship, fourth-year pharmacy students in Japan must pass the "pharmaceutical common accomplishment test," which combines computer-based testing and OSCE.[5] A candidate must complete a 52-week preregistration training program to achieve performance requirements for personal effectiveness, interpersonal skills, medicine, and health. The performance standards are regularly monitored and reviewed in the workplace by the tutor. Similarly, the Saudi Commission for Health Specialties (SCFHS) mandated prospective pharmacy graduates undergo a comprehensive review with the integration of the Saudi Pharmacist Licensure Examination (SPLE).[6] The SPLE validates the candidate's competency by evaluating their level of knowledge in all areas of pharmaceutical curricula in the Kingdom of Saudi Arabia (KSA).[6] Few published studies examine the associations between SPLE and improved pharmacy

practice.[7-9] Professional competencies should be reviewed and updated as pharmacists' professional responsibilities expand and healthcare systems evolve. Furthermore, it is unclear whether the current competency requirements in KSA are adequate for the country's healthcare system. Therefore, a review and validation of the present KSA competency criteria are required. This study was conducted to suggest changes to the KSA pharmacy competency standards and ascertain the opinions of KSA pharmacy practitioners and professors regarding the proposed pharmacy competency standards. It is a cross-sectional, descriptive research to explore the perceptions and attitudes of pharmacy workers in KSA and their association with SPLE.

METHODS

It analyzes a cross-sectional survey that discussed the Pharmacist's perception of the Saudi Pharmacist Licensure Exam 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-pharmacists or students and non-completed surveys will be excluded from the study. The survey consisted of respondents' demographic information about pharmacists and the perception of the Saudi Pharmacist Licensure Exam, and Factors to Passing the Saudi Pharmacist Licensure Exam. The 5-point Likert response scale system was used with closed-ended questions. According to the previous litterateur with 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 a drop-out rate 10%. As a result, the sample size will equal 380-420 with a power of study of 80%.[10-12] The response rate required for the calculated sample size is at least 60-70 % and above.[12,13] 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 the Saudi Pharmacist Licensure Exam 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. Beside, inferential analysis of factors affecting pharmacists and the perception of the Saudi Pharmacist Licensure Exam, and Factors to Passing the Saudi Pharmacist Licensure Exam 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.[14,15]

RESULTS

A total number of 701 pharmacists responded to the questionnaire. Of them, more than one-third responded from the Eastern region (268 (38.23%)) and one Quarter responded from the southern part (185 (26.39%)), and one-fifth responded from the western region (147 (20.97%)), with statistically significant differences between the provinces (*p*=0.000). Most of the responders were from National Guard Hospitals (145 (20.68%)), Security Forces Hospitals (108 (15.41%)), and Ministry of Health (MOH) hospitals (99 (14.12%)), with a statistically significant difference between working sites (*p*=0.000). The majority of hospitals with a capacity of 301-400 beds (151 (21.54%)) and 201-300 beds (150 (21.40%)). Males responded more than females (140 (59.32%)) versus 96 (40.68%)), with statistically significant differences between all levels (*p*=0.001). Based on material status, Most of the responders were

divorced 129 (29.72%), single 124 (28.57%), and married 116 (26.73%), with statistically significant differences between them (*p*=0.000). Most of the responders were in the age group of 41-50 years (222 (31.68%)) and 51-60 years (206 (29.39%)), with statistically significant differences between all age groups (*p*=0.000). Most of the pharmacists were staff pharmacists (175 (46.05%)) and pharmacy supervisors (92 (24.21%)), with statistically significant differences between all levels (*p*=0.000). Most of the responders held Pharm D (132 (28.45%)), Postgraduate Year two PGY2 (80 (14.87%)), Postgraduate Year one PGY1 (69 (14.87%)), and Doctor of Philosophy in Pharmacy (65 (14.01%)). Most pharmacists had a work experience of 4-6 years (170 (41.16%)) and >6 years (97 (23.49%)), with a statistically significant difference between years of experience (*p*=0.000). Most of pharmacists works at outpatient pharmacy (86 ((21.66%)), and narcotics and controlled medications (78 ((19.65%)). Most pharmacists graduated with a GPA of good (161 ((41.82%)) and very good (116 ((30.13%)) and work with a monthly salary of 12,000 - 14,000 SR (123 ((37.05%)) with statistically significant differences between all levels (*p*=0.000). The majority of pharmacists admitted to the Saudi License Exam 3 times (218 ((31.10%) and two times (189 ((26.96%)) with statistically significant differences between all levels (*p*=0.000). There was a medium positive correlation between age (years) and years of experience in a pharmacy career based on Kendall's tau_b (0.482) and Spearman's rho (0.567) correlation coefficients, with a statistically significant difference between them (*p*<0.000). There was a medium positive correlation between age (years) and Monthly income based on Kendall's tau_b (0.406) and Spearman's rho (0.483) correlation coefficients, with a statistically significant difference between them (*p*<0.001). There was a medium positive correlation between age (years) and material status based on Kendall's tau_b (0.390) and Spearman's rho (0.471) correlation coefficients, with a statistically significant difference between them (*p*<0.001). There was a medium positive correlation between material status and Years of experience based on Kendall's tau_b (0.406) and Spearman's rho (0.476) correlation coefficients, with a statistically significant difference between them (*p*<0.001). There was a medium positive correlation between Years of experience and current positions based on Kendall's tau_b (0.370) and Spearman's rho (0.430) correlation coefficients, with a statistically significant difference between them (*p*<0.001). There was a medium positive correlation between Years of experience and monthly income based on Kendall's tau_b (0.480) and Spearman's rho (0.552) correlation coefficients, with a statistically significant difference between them (*p*<0.001) (Tables 1 and 2).

The average score of perception of pharmacists about the Saudi Pharmacist License Exam was (2.99). The element "I do not have any concerns or fear regarding implementation of board license exam" obtained the highest score (3.15). The pharmacists believe that a licensing exam at entry practice and reassessment of competencies after initial licensure is required (3.06). In contrast, the lowest score was obtained for "the current pharmacist licensure examination effective to assess knowledge, skills, and attitude" (2.77). The score of the component "I believe this exam reflected my knowledge and competency as a pharmacist" was 2.87, and for the element "pharmacists believe that licensure exam will prepare for USA and UK license board" was 2.90, with a statistically significant difference between the responses (*p*<0.001). All aspects of the perception of pharmacists about the Saudi Pharmacist License Exam were statistically significant between responses (*p*<0.05) (Table 3). The average score for the "Factors affected to pass the Saudi pharmacist license exam" was 3.14. The component "Competency/ Clinical knowledge" score was (3.38). The score for the element "reading of exam material" was (3.37), and "pharmacy policy and procedures knowledge "was (3.31). In contrast, low scores were obtained for the elements "publications experiences" (2.93), "previous background knowledge" (2.98), and "advance certificates, e.g., ACLS- MTM" (2.99),

Table 1: Demographic, social information.

Nationality	Response Count	Response Percent	p-value (X2)
Central area	40	5.71%	0.000
North area	61	8.70%	
South area	185	26.39%	
East area	268	38.23%	
West area	147	20.97%	
Answered question	701		
Skipped question	0		
Site of work	**Response Count**	**Response Percent**	**p-value (X2)**
MOH Hospitals	55	7.85%	0.000
Military hospitals	99	14.12%	
National Gaurd Hospital	145	20.68%	
Security forces hospitals	108	15.41%	
University Hospital	78	11.13%	
MOH primary care centers	65	9.27%	
Private hospitals	38	5.42%	
Private ambulatory care clinics	17	2.43%	
Private primary healthcare center	10	1.43%	
Community pharmacy	31	4.42%	
Pharmaceutical companies	20	2.85%	
College of Pharmacy (Academia)	14	2.00%	
King Faisal Specialist Hospitals and Research Center	7	1.00%	
Intern	5	0.71%	
Non-employment	9	1.28%	
Answered question	701		
Skipped question	0		
No. of Licensed Beds	**Response Count**	**Response Percent**	**p-value (X2)**
1-50	29	4.14%	0.000
51-100	49	6.99%	
101-200	81	11.55%	
201-300	150	21.40%	
301-400	151	21.54%	
401-500	105	14.98%	
501-600	37	5.28%	
> 600	23	3.28%	
Medical City	22	3.14%	
Non-applicable	54	7.70%	
Answered question	701		
Skipped question	0		
Gender	**Response Count**	**Response Percent**	**p-value (X2)**
Male	140	59.32%	0.000
Female	96	40.68%	
Answered question	236		
Skipped question	465		

Marital status	Response Count	Response Percent	p-value (X2)
Single	124	28.57%	0.000
Married	116	26.73%	
Divorce	129	29.72%	
Widowed	65	14.98%	
Answered question	434		
Skipped question	267		
Age	**Response Count**	**Response Percent**	**p-value (X2)**
24-30 years	109	15.55%	0.000
31-40	126	17.97%	
41-50	222	31.67%	
51-60	206	29.39%	
> 60	38	5.42%	
Answered question	701		
Skipped question	0		

Table 2: Demographic, pharmacy career information.

Pharmacist Qualifications	Response Count	Response Percent	p-value (X2)
Bachelor's in pharmacy	59	12.72%	0.000
Master	40	8.62%	
Doctor of Pharmacy (Pharm D)	132	28.45%	
Doctor of Philosophy (Ph.D.)	65	14.01%	
Postgraduate Year One (PGY1)	69	14.87%	
Postgraduate Year Two (PGY2)	80	17.24%	
Postgraduate Year Three (PGY3)	40	8.62%	
Fellowship	18	3.88%	
Answered question	464		
Skipped question	237		
GPA scores	**Response Count**	**Response Percent**	**p-value (X2)**
Excellent	52	13.51%	0.000
Very good	116	30.13%	
Good	161	41.82%	
Acceptance	56	14.55%	
Answered question	385		
Skipped question	316		
Position Held	**Response Count**	**Response Percent**	**p-value (X2)**
Director of Pharmacy	14	3.68%	0.000
Assistant Director of Pharmacy	41	10.79%	
Supervisor	92	24.21%	
Pharmacy staff	175	46.05%	
Pharmacist intern	52	13.68%	
Non-employment	6	1.58%	
Answered question	380		
Skipped question	321		

Table 2: Cont'd.

Years of experience as a pharmacist career	Response Count	Response Percent	*p*-value (X2)
Less than one year	71	17.19%	0.000
1-3	75	18.16%	
4-6	170	41.16%	
>6	97	23.49%	
Answered question	**413**		
Skipped question	**288**		
The practice area	**Response Count**	**Response Percent**	***p*-value (X2)**
Inpatient Pharmacy	61	15.37%	0.000
Outpatient Pharmacy	86	21.66%	
Satellite Pharmacy	53	13.35%	
Narcotics and Controlled	78	19.65%	
Extemporaneous Preparation	54	13.60%	
Clinical Pharmacy	68	17.13%	
Inventory Control	29	7.30%	
Drug Information	24	6.05%	
IV admixture	33	8.31%	
Community pharmacy	46	11.59%	
Pharmaceutical companies	30	7.56%	

	Response Count	Response Percent	
Heath insurance company	0	0.00%	
Un-employment	7	1.76%	
Answered question	397		
Skipped question	304		
Monthly income	**Response Count**	**Response Percent**	***p*-value (X2)**
6,000-8,000 SR	63	18.98%	0.000
9,000-11,000 SR	41	12.35%	
12,000-14,000 SR	123	37.05%	
15,000-17,000 SR	75	22.59%	
18,000-20,000 SR	23	6.93%	
> 20,000 SR	7	2.11%	
Answered question	332		
Skipped question	369		
The number of times to enter the exam	**Response Count**	**Response Percent**	***p*-value (X2)**
1	141	20.11%	0.000
2	189	26.96%	
3	218	31.10%	
>3	153	21.83%	
Answered question	**701**		
Skipped question	**0**		

Table 3: The Perception of the Saudi Pharmacist Licensure Exam.

No	Element	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree		Total	Weighted Average	p-value (X2)
1	I think the current pharmacist licensure examination is adequate to assess (1) knowledge, (2) skills, and (3) attitude	15.77%	108	28.47%	195	25.55%	175	23.65%	162	6.57%	45	685	2.77	0.000
2	I believe the current pharmacist licensure examination reflects the learning objectives of pharmacy schools	14.66%	100	23.02%	157	25.37%	173	26.98%	184	9.97%	68	682	2.95	0.000
3	I believe this exam reflected my knowledge and competency as a pharmacist	17.54%	117	25.49%	170	20.69%	138	25.49%	170	10.79%	72	667	2.87	0.000
4	I think pharmacists in Saudi Arabia should be required to complete a licensing exam at entry-to-practice	14.29%	91	21.04%	134	23.70%	151	26.37%	168	14.60%	93	637	3.06	0.000
5	I think the mandatory pharmacist licensing exam will impact patient care in Saudi Arabia	15.35%	95	21.32%	132	22.46%	139	28.76%	178	12.12%	75	619	3.01	0.000
6	I think pharmacists should be required to complete a reassessment of competencies after initial licensure	13.57%	84	19.39%	120	26.17%	162	29.56%	183	11.31%	70	619	3.06	0.000
7	I do not have any concerns or fears regarding the implementation of the pharmacy board license exam	11.95%	70	20.31%	119	23.72%	139	28.84%	169	15.19%	89	586	3.15	0.000
8	I think the pharmacist licensing exam will prepare for USA or UK license board exam	14.23%	77	24.03%	130	27.36%	148	26.43%	143	7.95%	43	541	2.9	0.000

Table 3: Cont'd.

9	I think the pharmacist licensing exam will prepare for pharmaceutical board specialties exams in the USA	12.86%	67	21.11%	110	28.41%	148	24.95%	130	12.67%	66	521	3.03	0.000
10	I think the SPLE highlighted areas of weaknesses in skills and knowledge	14.42%	74	20.47%	105	26.51%	136	25.15%	129	13.45%	69	513	3.03	0.000
11	I think the SPLE reflected the pharmacy practice competency	10.33%	50	22.73%	110	25.83%	125	28.51%	138	12.60%	61	484	3.1	0.000
	Answered											700		
	Skipped											1		

with statistically significant differences between the responses ($p<0.001$). All responses about aspects of perception of Factors that affected passing the Saudi pharmacist license exam were statistically significant ($p<0.001$) (Table 4). The score for single-test reliability analysis of McDonald's ω was 0.841, Cronbach's α was 0.841, Gutmann's was λ2, 0.845, Gutmann's λ6 was 0.864, and Greater Lower Bound was 0.923 with statistically significant ($p<0.05$).

Factors affecting the perception of pharmacists about a Saudi Pharmacist License Exam (SPLE)

Factors affecting the perception were analyzed. We adjusted the significant values using the independent samples Kruskal–Wallis test and the Bonferroni correction for multiple tests. Pharmacists' perception of SPLE includes location, worksite, healthcare institution bed capacity, gender, material status, age, GPA grade, years of experience, current position, monthly income, and the number of exam admissions. Five locations affected the perception of pharmacists about SPLE. The central region showed the highest scores (3.2738), with statistically significant differences between regions ($p=0.003$). Fourteen worksites affected the perception of SPLE. Academia affected the perception of SPLE with a statistically significant difference between working sites ($p=0.001$) without significance among all sites. Based on the number of beds capacity in healthcare institutions, 51-100 responders showed low scores (2.6969) with a statistically significant difference ($p=0.000$). The gender was non-statistically significant and affected the perception of pharmacists on SPLE ($p=0.205$). The single material status showed the highest score (3.1914) of perception with a statistically significant difference ($p=0.000$). The age of the responders affected the perception of SPLE. Pharmacists aged 24-30 showed the highest score (3.2429), with a statistically significant difference between all age groups ($p=0.000$). The GPA grade might affect the perception of SLPE. The excellent grade scored the highest (3.2616), with a statistically significant difference ($p=0.006$).

Four levels of work experience affected the perception of SPLE. The highest score (3.2715) was obtained for those with work experience of less than one year, with a statistically significant difference between all levels ($p=0.000$). Six levels of the position affected the perception of pharmacists, with the lowest score (2.7913) obtained for the assistant director of pharmacy with a statistically significant difference between all levels ($p=0.009$). The monthly income affected the perception of SPLE. The salary of 6,000-8,000 SR had the highest score (3.1259) with a statistically significant difference ($p=0.007$). The number of SPLE admissions might affect the perception. The one-time admissions scored the highest (3.1004) with a statistically significant difference ($p=0.022$).

The relationship between the perception of SPLE and factors such as location, worksite, age (years), gender, nationality, practice area, position held, and years of experience 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 medium relationship (R=0.358 with $p=0.007$) between the perception of SPLE and its factors. Ten out of eleven were non-significant differences ($p>0.05$). However, multiple regression analysis confirmed that one factor (i.e., GPA after graduation) explained 17.4 % of the negative relationship to the variation in perception, with a statistically significant difference ($p=0.026$). The bootstrap model was also confirmed. Furthermore, the relationship was verified by the non-existence of multicollinearity with the current position factor with a variance inflation factor (VIF) of 1.276, less than three or five as a sufficient number of VIF (Table 5).[16-18]

Factors affecting the Factors to Pass the Saudi Pharmacist License Exam (SPLE)

Factors affecting the passing factors of the Saudi Pharmacist License Exam (SPLE) 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 passing factors of the Saudi Pharmacist License Exam (SPLE) include location, worksite, number of bed capacity, gender, material status, age, GPA, years of experience, current position, monthly income, and number of SPLE admissions. Five locations affected the perception of pharmacists about factors that might affect passing factors of the Saudi Pharmacist License Exam (SPLE). The central region showed the highest scores (3.4074), with statistically significant differences between regions ($p=0.000$). Fourteen worksites affected the perception of SPLE. The working site involved the factors of passing SPLE with a statistically significant difference between working sites ($p=0.0.16$) without significant specific among all sites. Based on the number of beds capacity in healthcare institutions, non-hospital responders scored the highest (3.3247) with a statistically significant difference ($p=0.027$).

Gender was non-statistically significant and affected the factors passing the SPLE ($p=0.659$). The single material status showed the highest score (3.3485) of perception with a statistically significant difference ($p=0.000$). The age of the responders affected the perception of SPLE. Pharmacists aged 24-30 years showed the highest score (3.3642), with a statistically significant difference between all age groups ($p=0.000$). The GPA grade might affect the factors passing the SLPE. The excellent grade scored the highest (3.3769), with a statistically significant difference ($p=0.016$). Four levels of work experience affected the perception of SPLE. The highest score (3.3650) was obtained for those with work experience of less than one year, with a statistically significant difference between all levels ($p=0.000$). Six levels of the position held affected the factors passing the SPLE with a statistically significant difference between all levels ($p=0.011$) and non-significant of any levels positive among them. The monthly income affected the perception of SPLE. The salary level affected the factors passing SPLE with a statistically significant difference ($p=0.014$) and no significance among all salary levels. The number of

Table 4: Factors to Pass the Saudi Pharmacist Licensure Exam.

		Strongly disagree		Disagree		Uncertain		Agree		Strongly agree		Total	Weighted Average	*p*-value (X2)
1.	Previous background knowledge	17.70%	83	19.40%	91	24.31%	114	24.31%	114	14.29%	67	469	2.98	0.000
2.	Hospital Pharmacy practice experience	10.96%	50	21.05%	96	22.37%	102	28.51%	130	17.11%	78	456	3.2	0.000
3.	Reading material for the exam	10.23%	45	16.14%	71	22.27%	98	29.32%	129	22.05%	97	440	3.37	0.000
4.	Practice questions for the exam	10.43%	44	17.30%	73	25.36%	107	26.54%	112	20.38%	86	422	3.29	0.000
5.	Competency/clinical knowledge	8.31%	34	15.65%	64	23.96%	98	34.23%	140	17.85%	73	409	3.38	0.000
6.	Maturity level	10.97%	43	19.13%	75	27.81%	109	30.87%	121	11.22%	44	392	3.12	0.000
7.	Confidence level	10.88%	42	22.02%	85	20.73%	80	28.76%	111	17.62%	68	386	3.2	0.000
8.	Research experiences	8.60%	32	19.35%	72	29.84%	111	29.84%	111	12.37%	46	372	3.18	0.000
9.	Publications experience	14.05%	51	22.59%	82	30.03%	109	23.14%	84	10.19%	37	363	2.93	0.000
10.	Pharmacy Police and procedures knowledge	9.58%	34	16.62%	59	23.94%	85	32.68%	116	17.18%	61	355	3.31	0.000
11.	Community pharmacy working experience	11.50%	39	18.88%	64	28.91%	98	29.79%	101	10.91%	37	339	3.1	0.000
12.	Type clinical pharmacy rotation experience	9.37%	31	19.64%	65	25.68%	85	29.31%	97	16.01%	53	331	3.23	0.000
13.	Leadership experiences	11.18%	37	23.87%	79	27.79%	92	25.38%	84	11.78%	39	331	3.03	0.000
14.	Additional advanced degrees (e.g., MBA, Ph.D.)	11.87%	40	18.99%	64	33.23%	112	27.60%	93	8.31%	28	337	3.01	0.000
15.	Advanced certifications (e.g., ACLS, MTM)	13.61%	43	22.15%	70	28.48%	90	22.78%	72	12.97%	41	316	2.99	0.000
16.	Advance pharmaceutical board specialties certification (BCPS, ..)	10.93%	34	19.94%	62	28.94%	90	27.97%	87	12.22%	38	311	3.11	0.000
17.	Professional society involvement Extracurricular activities	11.80%	36	18.69%	57	33.44%	102	28.85%	88	7.21%	22	305	3.01	0.000
18.	Volunteers pharmacy- related work experience	12.12%	36	21.89%	65	25.25%	75	30.30%	90	10.44%	31	297	3.05	0.000
19.	Pharmacy GPA	10.78%	33	17.97%	55	29.74%	91	28.43%	87	13.07%	40	306	3.15	0.000
20.	Pharmacy law knowledge and experiences	8.22%	25	16.78%	51	25.66%	78	36.18%	110	13.16%	40	304	3.29	0.000
	Answered											587		
	Skipped											114		

SPLE admissions might affect the perception. The one-time admissions had the highest score (3.2912) with a statistically significant difference (*p*=0.000)

The relationship between the passing of the SPLE and factors affecting it include location, worksite, number of bed capacity, gender, material status, age, GPA, years of experience, current position, monthly income, and number of SPLE admissions. The multiple regression analysis considered factors of the passing of SPLE as the dependent variable and factors affecting it as an expletory variable. There was a weak relationship (R=0.334 with *p*=0.023) between the factors passing the SPLE and the factors involving it. All eleven factors were non-significant differences in the relationship (*p*>0.05). The bootstrap model was also confirmed (Table 6).

DISCUSSION

From the analyzed results of this study, pharmacist practice in the Kingdom of Saudi Arabia (KSA) has drastically transformed in the past with the integration of the Saudi Pharmacist Licensure Examination (SPLE). The current study with convenient sampling method and an appropriate number of involved pharmacists. The sample distribution was not equal, which is expected because of the sampling method. Most pharmacists lived in the Southern area and were female, which is acceptable because the research team members who lived in the southern region were female gender. The results showed variation in age levels, pharmacist qualifications, different positions held, experiences, practice areas, monthly income, GPA score during pharmacy school, and the number of SPLE admissions. That has advantages and disadvantages at the same time. The advantage of various characteristics of sample representation of the entire society. In contrast, carry the penalties with a non-equal sample. The demographic data showed a correlation between

Table 5: Multiple regression of Factors with the Pharmacist perception of the Saudi Pharmacist Licensure Exam.

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)	.358[b]	.128	2.458	.007[b]	3.310	0.384		8.622	0.000	2.553	4.068		
	Location					-0.008	0.038	-0.015	-0.200	0.842	-0.082	0.067	0.892	1.121
	Site of work					0.007	0.013	0.041	0.536	0.593	-0.019	0.033	0.807	1.239
	No of beds					0.033	0.016	0.152	2.051	0.042	0.001	0.065	0.867	1.153
	Pharmacist gender					0.000	0.098	0.000	0.003	0.998	-0.194	0.194	0.894	1.119
	Marital status					-0.091	0.062	-0.129	-1.465	0.145	-0.214	0.032	0.607	1.646
	Age (years)					0.003	0.061	0.004	0.043	0.966	-0.118	0.123	0.449	2.228
	GPA					-0.131	0.059	-0.174	-2.240	0.026	-0.247	-0.016	0.784	1.276
	Years of experience in a pharmacy career					0.046	0.075	0.075	0.615	0.539	-0.102	0.194	0.321	3.117
	Position Held					0.032	0.049	0.051	0.642	0.521	-0.066	0.129	0.754	1.326
	Monthly income					-0.034	0.052	-0.062	-0.660	0.510	-0.137	0.068	0.530	1.887
	No SPLE admissions					-0.033	0.050	-0.055	-0.672	0.503	-0.132	0.065	0.704	1.420

a. Dependent Variable: pharmacist perception of SPLE, Predictors: (Constant), Location, Site of work, No of beds, Gender, Material status, Age (years), GPA, Years of experience at pharmacy career, Position Held, Monthly income, and No of SPLE admissions

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	3.310	-0.018	0.434	0.001	2.414	4.108
	Location	-0.008	-0.001	0.038	0.859	-0.082	0.062
	Site of work	0.007	-1.923E-05	0.013	0.576	-0.019	0.032
	No of beds	0.033	-3.147E-05	0.019	0.083	-0.005	0.070
	Age (years)	0.000	0.003	0.100	0.998	-0.186	0.202
	Pharmacist gender	-0.091	0.001	0.050	0.068	-0.186	0.010
	Marital status	0.003	0.001	0.048	0.957	-0.090	0.102
	GPA	-0.131	0.002	0.055	0.019	-0.241	-0.031
	Years of experience in a pharmacy career	0.046	-0.003	0.072	0.518	-0.093	0.199
	Position Held	0.032	0.000	0.046	0.497	-0.050	0.126
	Monthly income	-0.034	0.004	0.045	0.430	-0.114	0.059

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

Table 6: Multiple regression of Factors with the passing factors of the Saudi Pharmacist Licensure Exam.

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)	.334b	.111	2.088	.023b	3.811	0.353		10.801	0.000	3.115	4.508		
	Location					-0.007	0.034	-0.015	-0.199	0.843	-0.075	0.061	0.891	1.122
	Site of work					-0.010	0.012	-0.065	-0.843	0.401	-0.034	0.014	0.813	1.230
	No of beds					0.014	0.015	0.070	0.932	0.352	-0.016	0.043	0.867	1.153
	Pharmacist gender					-0.051	0.090	-0.042	-0.567	0.571	-0.229	0.127	0.892	1.122
	Marital status					-0.098	0.057	-0.154	-1.721	0.087	-0.210	0.014	0.607	1.647
	Age (years)					-0.057	0.056	-0.107	-1.029	0.305	-0.167	0.053	0.448	2.234
	GPA					-0.030	0.054	-0.044	-0.551	0.583	-0.137	0.077	0.777	1.287
	Years of experience in a pharmacy career					0.095	0.070	0.170	1.361	0.175	-0.043	0.233	0.313	3.194
	Position Held					0.027	0.045	0.048	0.592	0.555	-0.062	0.116	0.751	1.332
	Monthly income					-0.078	0.048	-0.157	-1.633	0.104	-0.172	0.016	0.526	1.901
	No of SPLE admissions					-0.079	0.046	-0.144	-1.723	0.087	-0.169	0.011	0.699	1.431

a. Dependent Variable: pharmacist perception of passing factors of the Saudi Pharmacist Licensure Exam, Predictors: (Constant), Location, Site of work, No of beds, Gender, Material status, Age (years), GPA, Years of experiences at pharmacy career, Position Held, Monthly income, and No of SPLE admissions.

Bootstrap for Coefficients

Model		B	Bootstrapa				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	3.811	-0.017	0.460	0.001	2.843	4.688
	Location	-0.007	0.001	0.035	0.835	-0.073	0.061
	Site of work	-0.010	0.000	0.014	0.458	-0.036	0.018
	No of beds	0.014	0.000	0.019	0.452	-0.022	0.054
	Age (years)	-0.051	0.002	0.092	0.598	-0.219	0.136
	Pharmacist gender	-0.098	0.003	0.048	0.049	-0.189	0.001
	Marital status	-0.057	-0.002	0.040	0.160	-0.135	0.023
	GPA	-0.030	-0.001	0.044	0.516	-0.117	0.062
	Years of experience in a pharmacy career	0.095	-0.001	0.068	0.173	-0.039	0.226
	Position Held	0.027	-0.001	0.052	0.610	-0.073	0.131
	Monthly income	-0.078	0.004	0.046	0.101	-0.164	0.021

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

age and years of experience, position, marital status, and monthly income. That's expected because, with higher age, the pharmacist gets more experience, gets married, and brings additional benefits of salary.

Pharmacist's perception of a Saudi Pharmacist License Exam (SPLE)

The findings in this area provide crucial information about incorporating a reliable assessment of pharmacy skills into the present SPLE. First, the pharmacist's perception of SPLE was not adequate. The pharmacist most agreed with the exam is required to evaluate the pharmacist's competency in practice, not asses the knowledge background. That means the exam is helpful in pharmacy practice, which is the exam's objective. Many survey respondents concluded that the present licensure examination format could not accurately measure core competencies necessary to begin pharmacists. The poll results revealed that pharmacists who think SPLE is valuable for evaluating entry-level pharmacists' knowledge, skills, and attitudes toward their preparedness for the pharmacy profession received the lowest scores. Several respondents, particularly pharmacy graduates and preceptors, asserted that within five years of professional practice, the skill set required for pharmacy practice could be easily transmitted. These claims are supported by a study by Mendonca *et al.* (2017),[19] which found that pharmacist activities related to patient care, such as reception, counseling, and drug administration, were emphasized among long-practicing pharmacists with actual medical practice. As a result, the necessity of subjecting pharmacy graduates to additional rigorous testing programs before they start practicing was questioned.

The pharmacist emphasized the exam more practical with some factors that might help pass the exam, like good pharmacy practice competency and familiarity with policy and procedures. In contrast, the pharmacist agreed that research experience or publication helped pass the exam. That means the exam is appropriate for a newly graduated pharmacist, not a high-level expert or researcher pharmacist. Besides, the pharmacist agreed that the exam does not require more clinical knowledge, medication therapy monitoring, or advanced cardiac life support to pass the exam. Therefore, we suggest updating some parts of the exam to include some points like drug therapy monitoring or participation in the Cardiopulmonary Resuscitation (CPR) code, which is very useful in practice.

The ambition of pharmacy professionals frequently leads them to seek employment outside their current setting. A global competency validation standard is required to assess the employability of pharmacy employees in other regions of the world. Most pharmacist survey respondents felt that taking SPLE had prepared them for other UK and US licensing boards. SPLE exam takers frequently include common CRQs and DSPs in their academic program, enabling them to engage in ongoing pharmacotherapeutic activities.[20] To increase the candidate's competence and confidence in numerous areas of real-world practice, preparation for SPLE entails covering a wide range of intellectually challenging topics. As a result, these studies advance the critical thinking and analytical abilities fundamental to all other assessments.

Most of the participants in this study recognized that their roles and duties in delivering primary health care are essential. Henceforth, pharmacist understands their role in enabling the general patient well-being and the essence of drug prescription and therapeutic procedures in patient care. These findings are attributed to the introduction of SPLE before the commencement of pharmacy practice. It aligns with SCFHS's vision of enhancing pharmacists' participation in the care process by allowing them to contribute directly to the primary care processes.[21] Pharmacists with high SPLE scores were observed to have a tenured understanding of critical clinical responsibilities. Moreover, SPLE expands the role of pharmacists since they can now serve as an advisory capacity for other healthcare faculties, thereby ensuring appropriate and safe medication.

It is required that all pharmacy practitioners understand and recognize their changing roles in healthcare delivery. SPLE is a marketing tool to raise awareness of pharmacist roles by addressing them in the testing process. Furthermore, SPLE prepares entry-level pharmacists for the additional responsibilities and extensive duties expected in professional practice. Apart from the contemporary pharmacy roles, pharmacy practitioners are now expected to assume the clinical role that the modern healthcare industry demands.[22] Findings from this research study show that many pharmacists in KSA do not consider themselves integral to the allied healthcare team. The modern healthcare system requires the inclusion of pharmacists in the critical disease management process as central members of the healthcare-associated team whose role is to improve overall patient outcomes. Further evidence from clinical studies shows that allowing clinical pharmacists in healthcare facilities to accompany allied health members during clinical rounds, accompanied by the active participation of pharmacists in the progressive medical education programs, helps recognize pharmacists as key allied health team members.[22] Recognizing the pharmacist's role in the allied health team is instrumental in improving care delivery. Most positive attitudes of the SPLE came from a young pharmacist with limited experience and a lower position and a high GPA of the excellent score and one-time admission to the exam. That's expected because the SPLE started with an appropriate young new generation. The GPA had a medium correlation with affected the negative perception by almost 20% of SPLE other factors without correlation.

Perception about the Factors to Pass the Saudi Pharmacist License Exam (SPLE)

One of the exciting findings in this area is the contribution of the rate of admission to the SPLE to the success rate. Candidates with two or more admission rates showed a significant and positive correlation with the success rate, which suggests a beneficial influence on SPLE scores. It makes sense to believe that performance can predict pre-SPLE performance since the exam reflects pharmacy-related content and expertise. Given that SPLE candidates must review course material, pharmacology students who regularly take SPLE tend to be more prepared for upcoming pharmacy exams. That is because they are forced to comprehend both fundamental and complex pharmacology topics. Additionally, regular review of the course material helps students retain it in their minds, improving their memory capacity.[8] Additionally, compared to first-timers, students taking the SPLE for the second or third time are more jaded about the serious dangers and implications of poor performance. Consequently, these students will often ensure ample preparation and exemplary performance on SPLE.

The findings of this study uncovered a significant correlation between the higher SPLE scores and other pharmacology and therapeutic courses, which is explained by SCFHS's efforts to minimize medication errors in pharmacy practice and improve patient safety. As pharmacy practice is gradually shifting away from manufacturing and sales and focusing more on patient care, the validation of pharmacology knowledge is also changing.[23] The foundational knowledge in pharmacology practice is therefore determined from the early stages of learning. Spivey *et al.* (2020)[23] claim that the graduate's prior knowledge base and the acquisition of advanced certificates, such as Advance Life Cardiac Support - Mouth-to-Mouth ventilation (ACLS-MTM) scores, are pre-admission factors that influence the graduate's passing rate on the SPLE. Some of the most important predictors of a high SPLE score included higher marks on pre-pharmacy coursework and exams and high cumulative college scores.

In addition to the influence of other pre-pharmacy courses on the success of SPLE, older students, especially those with an undergraduate degree, were less likely to complete their SPLE on time. The speculation is that older students were more likely to have a certain period away from

continued education, thereby experiencing challenges in transitioning to a rigorous and demanding professional program course load. Chisholm-Burns *et al.* (2014)[24] noted in a study that older students have competing obligations and severe demands on their time outside of school because of underlying family obligations or career commitments that restrict their level of dedication and involvement in professional studies. Therefore, additional research is necessary to clarify the relationship between timely pharmacy school graduation and its effects on the entire pharmacy profession.

CONCLUSION

The findings of this study offer important insights into the implementation of competent pharmacy skills assessment in the current SPLE. Several realizations among survey respondents claimed that the current licensure examination format could not adequately measure key competence relevant to entry-level pharmacists. The survey findings showed the lowest score among pharmacists who believe that SPLE is an effective program to assess entry-level pharmacists' knowledge, skills, and attitudes concerning their readiness for pharmacy practice. Several respondents, especially pharmacy graduates and preceptors, claimed that the necessary skill set for pharmacy practice could be easily imparted within five years of professional practice. A research study by Mendonca et al. (2017)19 affirms these claims where pharmacist activities related to patient care, such as reception, counseling, and drug administration, were found to be accentuated among long-practicing pharmacists with an extensive medical practice25 subjecting pharmacy graduates to additional rigorous testing programs before the commencement of practice was therefore put in question.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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

SPLE: Saudi Pharmacist Licensure Examintion; **OSCE:** Objective structured clinical examination; **SCFHS:** Saudi Commission for Health Specialties; **MOH:** Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **CBAHI:** Saudi Center for Accreditation of healthcare institutions; **SPSS:** Statistical Package of Social Sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies in epidemiology statement; **USA:** United State of America; GPS: **UK:** United Kingdom; **GPA:** Grade Point Average; **CPR:** Cardiopulmonary Resuscitation; **DSPs:** Disabled Students Programs and Services; **ALCS-MTM:** Advance Life Cardiac Support - Mouth-to-Mouth ventilation

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