

Primary Healthcare Centers Pharmacy Technician Workforce over Twelve Years (2006-2017) in Saudi Arabia

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ABSTRACT

Objectives: To explore the workforce of pharmacy technician at MOH Primary Healthcare Centers over the past twelve years (2006-2017) in the kingdom of Saudi Arabia.

Methods: It is a retrospective analysis of twelve years (2006-2017) of Ministry of Health pharmacy technician workforce at Primary Healthcare Centers (PHCs) practice. All data derived from Ministry of Health Statistical Year Books and any missing appropriate information about pharmacy technician workforce, that's will be estimated through allied healthcare professional's data at each region including gender or nationality. It included pharmacy technician and exclude all types of pharmacists or clinical pharmacist's workforces at MOH PHCs setting. All calculations were based on MOH workforce standards of Primary Healthcare Centers. All calculation was done using Microsoft Excel version ten. **Results:** The total numbers of pharmacy Technician were 8,373 and who distributed at the hospital were 6,620 (79.06%), at primary care centers 1,623 (19.38 %) while administration regions 130 (1.55%). The total number of pharmacy technician was (1,623) with age (891-1,623 and average (1,292). While the average numbers per region of PHCs pharmacy technician were (65) with a range number of (32-84). The average numbers of pharmacy technician per pharmacist per region (9.11) with a range number of (0.83-14.83) annually. The estimated average age gender distribution of PHCs pharmacy Technician per region were male (31-72) with average 56 (86.15%), while the female was (6-12) and average 9 (13.84%). The estimated average age nationality distribution of PHCs pharmacy Technician per region was Saudi (30-80) with average 61 (93.84%), while the non-Saudi was (1-13) and average 4 (6.16%). **Conclusion:** One fifth of the pharmacy technician worked at the Ministry of Health PHCs. The majority of pharmacy technician was Saudi and the male gender. The ratio of pharmacy technician was very high related shortage of pharmacists. The analysis of pharmacy technician workforces at PHCs is highly recommended annually in Saudi Arabia.

Keywords: Primary Healthcare Center, Pharmacy technician, Workforce, Ministry of Health, Saudi Arabia.

INTRODUCTION

The primary healthcare center plays a major role in the healthcare system in the kingdom of Saudi Arabia.^[1] They provide the services of preventive medicine and management of common primary diseases. The number of PHCs expanded over the past years overall Saudi Arabia.^[1,2] Several healthcare services provided through PHCs, including medical care, nursing services, laboratory servers and pharmaceutical care. In the PHCs, the pharmacy staff, including Pharmacy Technician, pharmacist and clinical pharmacy. The General Administration of Pharmaceutical care released the pharmacist workforce standard and competency for pharmacist primary healthcare center.^[3,4] However, the pharmacy technician workforce standard or competency didn't exist yet. Several research discussed pharmacy technician roles and functions.^[5-8] However, the pharmacy technician workforce of PHCs discussed only during the mass gatherings hajj period.^[9-11] According to the best of the author's knowledge, there are no any local publications investigated the workforce of pharmacy technician at PHCs in Saudi Arabia or Gulf and Middle East countries. The study

aimed to declare the pharmacy technician workforce of PHCs in the Kingdom of Saudi Arabia.

METHODS

It is a retrospective analysis of twelve years (2006-2017) of MOH primary healthcare center (PHCs) pharmacy technician's workforce. All data derived from the Ministry of Health Statistical Year Books and any missing appropriate information about pharmacy technician workforce, that's will be estimated through allied healthcare professionals data at each region including gender or nationality.^[1,2,12-21] All pharmacy technician included in the study, while all pharmacists or clinical pharmacist's workforces at MOH primary healthcare centers excluded from the study. The type of PHCs level services included in the studies. All pharmacy technicians expected to provide pharmaceutical according to the American Society of Health-System Pharmacist (ASHP) definition and requirements. All types of pharmacy services based on the Saudi Central Board of hospital accreditation, Joint Commission on Hospital Accreditation, ASHP best practice standards and general administra-

Received: 03-03-2019;

Accepted: 15-05-2019

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www.ijpcs.net

DOI:
10.5530/ijpcs.2019.8.28

tion of the pharmaceutical care strategic plan.^[22-26] All pharmacy technician works in MOH hospitals or administration or non-MOH government hospitals and primary care centers excluded from the studies. All private hospital or community pharmacy technician excluded from the study. All calculations based on MOH workforce standards of PHCs. All calculation was done using Microsoft Excel version ten. The calculations were per each region for a total twenty-one regions; the primary health care centers, distribution numbers, the pharmacy technician distribution numbers, the ratio of pharmacy technician per primary healthcare center, the ratio of the pharmacist to the pharmacy technician per primary healthcare center, the gender distribution of pharmacy technician per region and the gender distribution of Saudi pharmacy technician per each region overall Saudi Arabia.

RESULTS

The total numbers of hospitals were 282 hospitals, 2,361 primary care centers and 20 administrative regions. The total numbers of pharmacy Technician were 8,373 and who distributed at the hospital were 6,620 (79.06%), at primary care centers 1,623 (19.38%) while administrative regions 130 (1.55%) (Table

1). The total number of pharmacy technician was (1,623) with range (891-1,623 and average (1,292) annually. While the average numbers per region of PHCs pharmacy Technician were (65) with a range number of (32-84). The region had highest an average number of PHCs pharmacy technician were Riyadh (233) followed by Quseem (107) and East Provinces (103) pharmacy Technician (Table 2). The average numbers of pharmacy technician per pharmacist per region (9.11) with a range number of (0.83-14.83) annually. The highest an average number of hospital pharmacy technician per pharmacist was located in Hail (16.63) followed by Jazan (16.06) and Riyadh (15.40) pharmacy Technician per pharmacist (Table 3). The estimated average range gender distribution of PHCs pharmacy Technician per region was male (31-72) with average 56 (86.15%), while the female was (6-12) and average 9 (13.84%). The highest average region of male gender was Riyadh (200), followed by Quseem (92) and East province (88), while the highest average region of female was Riyadh (36), followed by Quseem (16) and East province (16) (Table 4).

The estimated average range nationality distribution of PHCs pharmacy Technician per region was Saudi (30-80) with average 61 (93.84%), while the non-Saudi was (1-13) and average 4

(6.16%). The highest average region of Saudi gender was Riyadh (218), followed by Quseem (101) and East province (100), while the highest average region of non-Saudi was Riyadh (18), followed by Quseem (8) and Aseer (7) (Table 5). The estimated number range Saudi gender distribution of hospital pharmacy Technician per region was male (553-1,397) with average 1,085 (88.49%), while the female was (37-208) and average 141 (11.51%). The highest average region of male gender was Riyadh (193), followed by Quseem (90) and East province (348), while the highest average region of female was Riyadh (25), followed by East province (14) and Jeddah with Makkah (12) (Table 6).

DISCUSSION

The pharmacy technician distributed over three sectors. The major sectors were hospital, which contained almost more two-third of pharmacy technician while the primary healthcare centers had one-fifth of the total number of pharmacy technician. That's different from previous study;^[6,27] most of the pharmacy worked in community pharmacy and may it occurs in the future when Saudi Managed Pharmacy fully implemented with an updated pharmacy strategic plan with Saudi vision 2030.^[28,29] The remaining number of pharmacy

Table 1: demographic information of hospital and primary care distributions current year 2017

Region	No of hospital	Primary health center	No of hospital Pharmacy Technician	No of PHCs Pharmacy Technician	No of Pharmacy Technician at directories
MOH	0	0	0.00	0.00	61
Riyadh	49	436	1,324	309	12
Makkah	10	84	463	86	3
Jeddah	13	92	631	104	4
Taif	15	121	281	78	1
Madina	19	159	481	136	2
Quseen	19	181	488	122	6
East Province	20	143	566	107	4
Alhasa	9	72	206	70	2
Heralbatin	7	40	143	48	1
Aseer	20	254	350	99	7
Bisha	7	85	74	18	4
Tabouk	12	87	216	44	1
Hail	12	110	195	55	2
North Boarder	10	47	117	17	1
Jazan	21	170	419	126	2
Najran	11	69	268	95	3
Albaha	10	108	136	46	11
Aljouf	9	43	127	36	2
Alqurayat	4	17	58	15	0
Qunfetha	5	43	77	14	0
TOTAL	282	2,361	6,620	1,623	130

Table 2: Total number of PHCs Pharmacy Technician

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	mean
Riyadh	165	136	147	191	290	280	258	215	267	273	269	309	233
Makkah	112	34	38	52	75	103	353	74	91	68	86	86	98
Jeddah	54	40	58	74	122	140	0	132	151	162	168	104	100
Taif	35	29	33	38	56	82	0	57	63	70	74	78	51
Madina	40	20	36	74	97	113	106	93	98	113	114	136	87
Quseen	79	65	73	90	117	127	119	117	131	124	125	122	107
East Province	39	46	32	77	108	123	212	111	130	122	134	107	103
Alhasa	43	42	49	36	53	78	0	62	74	69	71	70	54
Heralbatin	13	9	11	13	20	44	0	21	20	22	31	48	21
Aseer	79	41	45	77	105	105	109	99	102	102	104	99	89
Bisha	11	8	9	23	19	46	0	23	20	15	17	18	17
Tabouk	15	10	14	34	46	46	35	43	45	34	37	44	34
Hail	26	19	25	48	60	71	43	48	47	45	45	55	44
North Boarder	15	11	16	23	26	21	22	27	21	16	16	17	19
Jazan	59	46	56	69	95	100	85	102	117	124	137	126	93
Najran	36	28	34	39	51	70	42	48	51	55	71	95	52
Albaha	35	26	24	36	52	59	47	52	44	38	40	46	42
Aljouf	22	16	17	28	27	34	31	22	25	23	26	36	26
Alqurayat	4	4	4	9	11	15	0	10	9	8	9	15	8
Qunfetha	9	7	9	12	16	24	0	20	18	15	16	14	13
TOTAL	891	637	729	1,043	1,446	1,681	1,463	1,377	1,524	1,499	1,590	1,623	1292
Average per city	45	32	36	52	72	84	73	69	76	75	80	81	65

Table 3: Total number of PHCs Pharmacy Technician per pharmacists

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	mean
Riyadh	2.80	0.99	1.86	15.88	144.95	4.12	3.49	2.69	2.28	2.02	1.94	1.77	15.40
Makkah	0.00	0.36	1.89	4.73	25.00	8.58	25.21	12.33	6.50	8.50	5.73	4.53	8.61
Jeddah	2.26	0.87	28.93	18.43	61.00	12.73	0.00	13.20	6.29	7.36	6.73	6.50	13.69
Taif	35.10	1.00	0.00	12.57	0.00	13.67	0.00	19.00	7.03	4.69	5.29	4.11	8.54
Madina	4.94	0.60	2.40	14.82	0.00	10.27	15.14	11.63	3.77	5.14	4.56	6.18	6.62
Quseen	19.82	0.97	0.00	14.97	0.00	21.17	59.26	10.60	6.89	5.92	6.23	6.78	12.72
East Province	3.50	1.43	2.15	7.72	35.86	9.46	23.56	10.09	6.19	4.69	3.93	2.68	9.27
Alhasa	0.00	1.14	0.00	36.25	0.00	13.00	0.00	0.00	7.37	6.25	5.09	3.32	6.03
Heralbatin	0.00	0.78	0.00	0.00	0.00	7.33	0.00	0.00	4.95	7.41	6.21	6.86	2.79
Aseer	0.00	0.62	0.00	7.68	0.00	7.50	13.62	7.60	3.19	1.89	1.70	1.67	3.79
Bisha	10.96	0.82	1.82	11.26	18.88	9.20	0.00	0.00	4.01	2.15	1.93	3.59	5.38
Tabouk	7.62	0.80	6.90	17.19	23.00	9.20	35.41	21.50	5.00	4.19	3.35	5.44	11.63
Hail	0.00	0.88	12.29	23.99	60.27	8.88	43.43	12.00	9.50	6.46	5.59	9.12	16.03
North Boarder	14.55	0.84	16.02	0.00	0.00	2.33	7.48	9.15	7.06	5.23	2.72	2.45	5.65
Jazan	4.52	0.93	3.96	7.67	95.00	5.89	8.54	25.39	10.64	11.27	10.54	8.41	16.06
Najran	36.12	0.91	33.83	4.91	0.00	7.78	21.07	24.00	7.32	7.84	5.46	8.64	13.16
Albaha	0.00	0.87	4.86	11.86	52.19	11.80	9.32	8.69	7.26	6.28	9.89	9.15	11.01
Aljouf	0.00	0.80	0.00	28.26	26.73	6.80	31.00	22.00	25.04	11.71	5.20	4.49	13.50
Alqurayat	0.59	1.06	1.86	0.00	0.00	7.50	0.00	0.00	4.64	2.75	3.10	4.87	2.20
Qunfetha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	16.67	118.79	238.20	0.00	177.20	296.53	209.88	134.92	111.76	95.19	100.54	182.11
Average per city	7.14	0.83	5.94	11.91	27.14	8.86	14.83	10.49	6.75	5.59	4.76	5.03	9.11

Table 4: Gender Distribution of PHCs Pharmacy Technician per region.

Region	2006		2007			2008			2009			2010			2011			2012			2013			2014			2015			2016			2017			mean		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F				
Riyadh	140	25	136	28	124	23	159	32	245	45	232	48	215	43	177	38	234	33	236	37	233	36	266	43	200	36												
Makkah	95	17	34	7	32	6	43	9	63	12	88	15	295	58	61	13	80	11	60	8	75	11	74	12	83	15												
Jeddah	46	8	40	8	49	9	61	12	103	19	124	16	0	0	109	23	132	19	141	21	145	23	90	14	87	14												
Taif	30	5	29	6	28	5	31	6	49	7	70	12	0	0	47	10	55	8	61	9	64	10	68	10	44	7												
Madina	33	6	20	4	30	6	62	12	82	15	96	17	89	17	77	16	86	12	98	15	99	15	120	16	74	13												
Quseen	67	12	65	13	62	11	75	15	99	18	108	19	99	20	96	21	115	16	109	15	108	17	105	17	92	16												
East Province	33	6	46	9	27	5	64	13	91	17	104	19	177	35	91	20	114	16	106	16	116	18	92	15	88	16												
Alhasa	37	7	42	8	42	8	30	6	45	8	67	11	0	0	51	11	65	9	60	9	61	10	60	10	47	8												
Heralbatin	11	2	9	2	10	2	11	2	17	3	37	7	0	0	18	3	17	3	19	3	27	4	42	6	18	3												
Aseer	67	12	41	8	38	7	64	13	89	16	88	17	91	18	81	17	91	11	88	14	90	14	85	14	76	13												
Bisha	9	2	8	2	8	1	19	4	16	3	39	7	0	0	19	4	18	2	13	2	15	2	16	2	15	3												
Tabouk	13	2	10	2	12	2	29	6	39	7	39	7	31	4	36	7	39	6	30	4	32	5	38	6	29	5												
Hail	22	4	19	4	21	4	40	8	51	9	59	12	38	5	40	8	42	6	39	6	39	6	47	8	38	7												
North Boarder	12	2	11	2	14	2	20	4	22	4	19	2	17	5	22	5	18	3	14	2	14	2	14	3	16	3												
Jazan	50	9	46	9	47	9	57	12	95	0	84	16	75	10	84	18	103	14	109	15	118	19	108	18	81	12												
Najran	31	6	28	6	29	5	33	7	48	3	65	5	37	5	40	8	45	6	48	7	61	10	82	13	46	7												
Albaha	30	5	26	5	21	4	30	6	49	3	49	10	39	8	43	9	38	5	33	5	34	5	40	6	36	6												
Aljouf	19	3	16	3	14	3	24	5	25	2	34	0	31	0	22	0	22	3	20	3	26	0	31	5	24	2												
Alqurayat	3	1	4	1	3	1	7	1	11	0	15	0	0	0	10	0	8	1	8	0	9	0	13	2	8	1												
Qunfetha	8	1	7	1	8	1	10	2	16	0	24	0	0	0	18	2	18	0	15	0	16	0	12	2	13	1												
TOTAL	755	137	637	129	616	113	868	175	1,254	192	1,441	240	1,235	228	1,143	234	1,339	185	1,307	192	1,382	208	1,402	221	1,115	188												
Average	38	7	32	6	31	6	43	9	63	10	72	12	62	11	57	12	67	9	65	10	69	10	70	11	56	9												

Table 5: Nationality Distribution of PHCs Pharmacy Technician per region.

Region	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		mean	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
Riyadh	118	47	127	37	120	27	171	20	267	23	266	14	255	3	200	15	263	4	272	1	260	9	298	11	218	18
Makkah	80	32	31	9	31	7	47	5	72	3	101	2	350	3	74	0	91	0	68	0	86	0	86	0	93	5
Jeddah	39	16	37	11	47	11	66	8	122	0	140	0	0	0	132	0	151	0	162	0	167	1	103	1	97	4
Taif	25	10	27	8	27	6	34	4	55	1	80	2	0	0	53	4	63	0	69	1	74	0	78	0	49	3
Madina	28	11	19	5	29	7	67	8	91	6	113	0	106	0	93	0	97	1	113	0	114	0	136	0	84	3
Quseen	57	23	61	18	60	13	81	9	110	7	125	2	114	5	110	6	131	0	121	3	120	4	121	1	101	8
East Province	28	11	43	12	26	6	69	8	106	2	119	4	210	2	108	3	130	0	122	0	133	1	107	0	100	4
Alhasa	31	12	39	11	40	9	33	4	53	0	76	2	0	0	59	3	74	0	69	0	71	0	70	0	51	3
Heralbatin	9	4	8	2	9	2	12	1	19	1	42	2	0	0	21	0	20	0	22	0	31	0	48	0	20	1
Aseer	56	22	38	11	37	8	69	8	99	6	98	7	104	5	92	7	102	0	102	0	101	3	98	1	83	7
Bisha	8	3	7	2	7	2	20	2	18	1	46	0	0	0	22	2	20	0	15	0	17	1	18	0	16	1
Tabouk	11	4	10	3	11	3	31	4	46	0	46	0	35	0	42	1	45	0	33	0	37	0	44	0	33	1
Hail	18	7	18	5	20	4	43	5	57	4	66	5	43	0	47	1	46	2	44	1	43	2	55	0	42	3
North Boarder	10	4	10	3	13	3	21	2	24	2	21	0	22	0	27	0	21	0	15	1	16	1	17	0	18	1
Jazan	42	17	43	12	45	10	62	7	95	0	100	0	85	0	100	2	117	0	123	1	137	0	124	2	89	4
Najran	26	10	26	8	28	6	35	4	48	3	65	5	42	0	45	3	49	2	53	2	69	2	94	1	48	4
Albaha	25	10	25	7	20	4	32	4	49	3	55	4	45	2	49	3	42	2	36	1	38	1	45	1	38	4
Aljouf	16	6	15	4	14	3	25	3	25	2	34	0	31	0	22	0	25	0	23	0	26	0	36	0	24	2
Alqurayat	3	1	4	1	3	1	8	1	11	0	15	0	0	0	10	0	9	0	8	0	9	0	15	0	8	0
Qunifetha	6	3	6	2	7	2	11	1	16	0	24	0	0	0	20	0	18	0	15	0	16	0	14	0	13	1
TOTAL	637	255	594	172	596	133	936	107	1,382	64	1,632	49	1,444	19	1,325	52	1,514	11	1,486	13	1,566	25	1,605	18	1,226	76
average	32	13	30	9	30	7	47	5	69	3	82	2	72	1	66	3	76	1	74	1	78	1	80	1	61	4

Table 6: Gender Distribution of Saudi PHCs Pharmacy Technician per region

Region	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Mean	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Riyadh	111	7	118	9	112	8	154	17	240	27	232	34	215	40	173	26	232	31	236	36	231	29	264	34	193	25
Makkah	75	5	29	2	29	2	42	5	63	9	88	13	295	55	61	13	80	11	60	8	75	11	74	12	81	12
Jeddah	37	2	34	3	44	3	60	7	103	19	124	16	0	0	109	23	132	19	141	21	144	23	89	14	85	12
Taif	24	1	26	2	25	2	30	3	49	6	70	10	0	0	46	7	55	8	61	8	64	10	68	10	43	6
Madina	27	2	17	1	27	2	60	7	82	9	96	17	89	17	77	16	86	11	98	15	99	15	120	16	73	11
Quseen	53	3	56	4	56	4	73	8	99	11	108	17	99	15	96	14	115	16	109	12	107	13	105	16	90	11
East Province	26	2	40	3	25	2	62	7	89	17	102	17	177	33	90	18	114	16	106	16	115	18	92	15	86	14
Alhasa	29	2	36	3	37	3	29	3	45	8	67	9	0	0	51	8	65	9	60	9	61	10	60	10	45	6
Heralbatin	9	1	8	1	9	1	11	1	17	2	37	5	0	0	18	3	17	3	19	3	27	4	42	6	18	2
Aseer	53	3	36	3	35	3	62	7	89	10	88	10	91	13	80	12	91	11	88	14	89	12	84	14	74	9
Bisha	7	0	7	1	7	1	18	2	16	2	39	7	0	0	19	3	18	2	13	2	15	2	16	2	15	2
Tabouk	10	1	9	1	11	1	28	3	39	7	39	7	31	4	36	6	39	6	29	4	32	5	38	6	28	4
Hail	17	1	17	1	19	1	39	4	51	6	59	7	38	5	40	7	41	5	39	5	38	5	47	8	37	5
North Boarder	10	1	9	1	12	1	19	2	22	2	19	2	17	5	22	5	18	3	14	2	14	2	14	3	16	2
Jazan	40	2	40	3	42	3	56	6	95	0	84	16	75	10	83	17	103	14	109	14	118	19	107	17	79	10
Najran	24	1	25	2	26	2	32	4	48	0	65	0	37	5	40	5	45	5	47	6	61	8	82	12	44	4
Albaha	24	1	23	2	19	1	29	3	49	0	49	6	39	6	43	6	38	4	33	4	34	4	40	5	35	4
Aljouf	15	1	14	1	13	1	23	3	25	0	34	0	31	0	22	0	22	3	20	3	26	0	31	5	23	1
Alqurayat	3	0	3	0	3	0	7	1	11	0	15	0	0	0	10	0	8	1	8	0	9	0	13	2	8	0
Qunfetha	6	0	6	0	7	1	10	1	16	0	24	0	0	0	18	2	18	0	15	0	16	0	12	2	12	1
TOTAL	600	37	553	42	555	41	843	93	1,247	135	1,439	193	1,235	209	1,134	191	1,336	177	1,305	181	1,376	189	1,397	208	1,085	141
Average	30	2	28	2	28	2	42	5	62	7	72	10	62	10	57	10	67	9	65	9	69	9	70	10	54	7

technician distributed to the medical affairs administration. The number of pharmacy technician at primary care centers consisted of little number with a high number of primary healthcare centers. Almost every center less one Full Time Employee (FTE) of pharmacy technician. The pharmacy technician workforce should increase at primary healthcare centers cover all requirements of service of MOH standers and Saudi healthcare accreditation. The highest region had a pharmacy technician at PHCs was Riyadh, Quseem and East province. That has expected because of the higher number of pharmacy technician among Saudi healthcare regions.

The highest ratio of pharmacy technician to pharmacist found at higher than and exceed the ratio of some previous studies,^[30,31] and that are related to the shortage of pharmacist not a high number of pharmacy technician especially in Hail or Jazan and Riyadh. The majority of gender distribution was male at the majority of primary care centers while female not exceeds than 15% of total pharmacy technician and that's differed from previous study.^[27] That has expected because of most of governmental or private, of college pharmacy technician graduate male genders just recently they graduated female pharmacy technician. The percentage of gender distribution almost the same, even with a higher number of pharmacy technicians like Riyadh or Quseem and East province had a higher number of male and female pharmacy technician.

The nationality distribution among pharmacy technician at the primary care center was high more 90%, while non-Saudi few numbers. The Saudization nationality project increased over the past twelve years, with both male and female genders, while non-Saudi pharmacy technician male and female decreased over the past twelve years. Besides, the reductions in non-Saudi were higher than increments in the Saudi pharmacy Technician and may lead to a shortage of a pharmacy technician in some regions. As a result, the pharmacy technician workforce should be implemented to prevent any over or under shortage of pharmacy technician resources. The distribution of pharmacy technician should be the same as the region with the equal pharmacist to pharmacy technician ratio to prevent any healthcare-related problems at primary healthcare centers. The detail information about pharmacy technician at primary healthcare centers should be documented annually overall regions of the Kingdom of Saudi Arabia.

CONCLUSION

The study was first study done in Saudi Arabia and Gulf and Middle East countries. The majority workforces of Ministry of Health pri-

mary healthcare centers pharmacy technicians were Saudi nationally and male was higher than female gender. The pharmacy technician to pharmacist ration was highly related to shortage of pharmacist. The annual report of PHCs pharmacy technician at all healthcare organizations is required in the kingdom of Saudi Arabia.


CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

ABBREVIATIONS

KSA: Kingdom of Saudi Arabia; **MOH:** Ministry of Health; **ASHP:** American Society of Health-System Pharmacist; **PHCs:** Primary Healthcare Centers.

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