Hospital Pharmacist Workforce in Eleven-Year 2006-2016 at Ministry of Health in Saudi Arabia

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Abstract

Objective: The workforce of hospital pharmacist is one the elements of pharmacy strategic plan in Saudi Arabia. The purpose of this study is to explore hospital pharmacist's workforce in eleven years (2006-2016) at Ministry of Health in Saudi Arabia. **Methods:** It is a retrospective analysis of eleven years (2006-2016) of MOH hospital pharmacist workforce. All data were derived from Ministry of Health statistical yearbooks. It included pharmacist or clinical pharmacist's workforces at MOH hospitals. The type of hospital included having bed capacity of 50-1500 beds with Adults public hospitals, pediatrics and maternity hospitals, Psychiatric hospitals, Diabetic centers, Cardiology centers, Oncology Centers, Renal Dialysis Centers, and Medical cities. All calculations were based on MOH workforce standards of hospitals. The calculations were per each region for a total of twenty-one regions; the hospital's distribution numbers, the pharmacist distribution numbers, the ratio of pharmacist per hospital, the gender distribution of Pharmacist per region, the gender distribution of Saudi pharmacist per each region across Saudi Arabia. **Result:** The total numbers of hospitals were 276 hospitals, 2,325 primary care centers, and 20 administration regions. The total numbers of pharmacists were 3,520, distributed at hospital 2,760 (78.41 %), at primary care centers 430 (12.2 %) while administration regions 330 (9.37 %). The average numbers of hospitals were (251.36) with a range number of (220-274), and the total number was (274). The average numbers of hospital pharmacists were (1,617.55) with a range number of (636-2760), and the total number was (2760). The total gender distribution of all hospital pharmacists was male 1,077.4 (61.30%) and female 680.1 (38.70%). The total nationality distribution of all hospital pharmacists was Saudi 1342.03 (81.57%) and non-Saudi 303.26 (18.43 %). Of Saudi primary care center pharmacist 861.05 (64.16%) was male and 480.98 (35.84%) was female. **Conclusion:** Number hospitals are increased over the past years. Despite the incremental number of hospital but the pharmacists over past years are same. Most of the hospital pharmacists were Saudi with more of half of staff were males. Targeting of the increasing number of Saudi hospital pharmacists through complete Saudisation standard is required.

Key words: Hospital pharmacist, Workforce, Manpower, Ministry of health, Saudi arabia.

INTRODUCTION

The pharmaceutical care founded in the early 2000s by the American society of health system pharmacists (ASHP).^[1] The major pillar of the concept was a pharmacist. During the implementation of the concept required enough number of a pharmacist and pharmacy qualification.^[2] The ASHP and other pharmacy organizations periodically published several investigations about the pharmacy workforce resources. It includes a pharmacist, clinical pharmacy and pharmacy technician in the United States of America (USA) and other countries.^[3-14] The number required is increased over the years. The world health organization has Published pharmacy workforce in Middle East countries with comparable among them and including Saudi Arabia.^[9] The report did discuss detail about nationality and gender distribution among cities at each country per each country, and even the report did not mention the detail about clinical pharmacy or pharmacy technicians. The authors are not familiar with any study in Saudi Arabia or Middle East countries to investigate the hospital pharmacist workforce. The goal of this study is to explore the pharmacist workforce over the past eleven years (2006-2016) at MOH hospitals in Kingdom of Saudi Arabia.

METHODS

It is a retrospective analysis of eleven years (2006-2016) of MOH hospital pharmacist workforce. All data were derived from Ministry of Health statistical yearbooks.^[15-25] It included pharmacist or clinical pharmacist's workforces at MOH hospitals. The type of hospital included having bed capacity 50-1500 beds with Adults public hospitals, pediatrics and maternity hospitals, Psychiatric hospitals, Diabetic centers, Cardiology centers, Oncology Centers, Renal Dialysis Centers, and Medical cities. All pharmacists were expected to provide pharmaceutical according to ASHP definition and requirements.^[11-2] All type of pharmacy services were based on Saudi Central Board of hospital accreditation, Joint commission of hospital accreditation, ASHP best practice standards, and general administration of the pharmaceutical care strategic plan.^[26-28] All Pharmacist works at MOH administration or non-MOH government hospitals and primary care centers were excluded from the studies. All private hospitals or community pharmacists were excluded from the study. All pharmacy technicians were excluded from the study. All calculations were based on MOH workforce standards of hospitals. The calculations were per each region for a total twenty-one regions; the hospital's distribution numbers, the pharmacist

distribution numbers, the ratio of pharmacist per hospital, the gender distribution of Pharmacist per region and the gender distribution of Saudi Pharmacist per each region across Saudi Arabia. All calculation was done used Microsoft Excel version ten.

RESULT

The total numbers of hospitals were 276 hospitals, 2,325 primary care centers, and 20 administration regions. The total numbers of small hospitals were 140 (50.72%), medium hospitals 95 (34.42%), small hospitals 18 (6.52%), Large hospitals 21 (7.61%), and medical cities 2 (0.72 %). The total numbers of pharmacists were 3,520, distributed at hospital 2,760 (78.41 %), at primary care centers 430 (12.2 %) while administration regions 330 (9.37 %) the last update information October 2016 as explored in Table 1. The average numbers of hospitals were (251.36) with a range number of (220-274), and the total number was (274). The highest region had a number of hospitals; Riyadh (44.45) followed by East Province (19.27) and Madina regions (19.09). The average numbers of hospital pharmacists were (1,617.55) with a range number of (636-2760), and the total number was (2760). The region had highest an average number of hospital pharmacists were Riyadh (392.64) followed by East Province (149.36) and Makkah regions (146.09) pharmacists as explore in Table 2, 3. The total gender distribution of all hospital pharmacists was male 1,077.4 (61.30%) and female 680.1 (38.70%). The total nationality distribution of all hospital pharmacists was Saudi 1342.03 (81.57%) and non-Saudi 303.26 (18.43 %). Of Saudi primary care center pharmacist 861.05 (64.16%) were male and 480.98 (35.84%) were female as explored in Table 4, 5 and 6.

DISCUSSION

The Ministry of Health in Kingdom of Saudi Arabia founded strategic health planning for ten years.^[29] The plan consisted of several elements including Human Resources of healthcare professionals. The pharmacy administration at MOH emphasized the element by establishment of pharmacy strategic plan with six general goals and pharmacy workforce was part of it.^[28] Before 2006, the numbers of pharmacists per each pharmacy organization including hospitals and primary care centers were not well established. The first MOH statistical book have reported the number of a pharmacists.^[15] In mid of the 2000s, the pharmacy administration established the requirements needed for hospital pharmacy staff.^[30-31] The new guidelines updated the hospital pharmacy staff requirements released during pharmacy strategic plan.^[28] The numbers increased several times, but the question rose what was the pharmacy workforce over past ten years, did the increments corrected, based on what's the decision made. The author explored the analysis of past eleven years the pharmacy staff at Ministry of Health hospitals. The findings showed that there was a moderate increase in the number of hospitals while the number of pharmacists did not increase accordingly. The number of graduated pharmacists were low; while the number has increased by establishment of several colleges of pharmacies.^[25] The gender distribution found the male pharmacist little bit more than female pharmacists with increased number over the past years. The study results almost similar that earlier reported elsewhere.^[8,12] While is lower than in female pharmacist what reported by Gal, Diane *et al.* in Europe, Western Pacific, Eastern Mediterranean countries without apparent reasons.^[9] The number of the pharmacists were lower that's what found by Mcleod, Donald C, and study

Table 1: Total number of hospital overall regions in Kingdom of Saudi Arabia.

	Region	No of Hospitals	Small <100	Medium 100–299	Large 300–399	Large 400- > or = 600	Medical Cities
1	Riyadh	42	19	19	1	2	1
2	Makkah	10	3	2	2	2	1
3	Jeddah	13	2	7	1	3	0
4	Taif	13	9	1	0	3	0
5	Madina	20	12	6	0	2	0
6	Quseen	19	10	6	1	2	0
7	East Province	20	13	2	3	2	0
8	Alhasa	11	4	5	0	2	0
9	Heralbatin	7	4	1	2	0	0
10	Aseer	20	8	11	0	1	0
11	Bisha	7	4	2	1	0	0
12	Tabouk	11	3	7	0	1	0
13	Hail	13	10	3	0	0	0
14	North Boarder	9	3	4	2	0	0
15	Jazan	21	13	7	0	1	0
16	Najran	12	8	3	1	0	0
17	Albaha	10	7	1	2	0	0
18	Aljouf	9	3	4	2	0	0
19	Alqurayat	4	2	2	0	0	0
20	Qunfetha	5	3	2	0	0	0
	Total	276	140	95	18	21	2

Table 2: Total number of hospitals.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Riyadh	40	40	42	44	44	45	46	47	47	47	47	44.45
Makkah	8	8	9	10	10	10	37	10	10	10	10	12.00
Jeddah	12	12	12	12	12	12	Missing Data	13	13	14	13	12.50
Taif	11	11	11	12	12	13	Missing Data	14	14	13	13	12.40
Madina	16	17	17	20	20	20	20	20	20	20	20	19.09
Quseen	16	16	17	17	17	17	18	18	18	18	18	17.27
East Province	17	18	18	19	18	18	32	18	18	18	18	19.27
Alhasa	8	8	8	9	9	9	Missing Data	9	10	10	10	9.00
Heralbatin	4	4	4	5	5	5	Missing Data	7	7	7	7	5.50
Aseer	18	18	19	16	16	16	27	21	20	20	20	19.18
Bisha	3	3	3	7	7	7	Missing Data	7	7	7	7	5.80
Tabouk	10	10	10	11	11	11	11	11	11	11	11	10.73
Hail	9	9	9	9	11	11	11	11	12	12	12	10.55
North Boarder	6	7	7	7	7	7	7	8	8	9	9	7.45
Jazan	15	15	15	16	18	18	19	20	21	21	21	18.09
Najran	10	9	9	9	11	11	10	10	10	11	11	10.09
Albaha	9	10	10	10	10	10	10	11	10	10	10	10.00
Aljouf	5	6	7	6	6	6	11	7	8	8	9	7.18
Alqurayat	2	3	3	4	3	3	Missing Data	4	4	4	4	3.40
Qunfetha	1	1	1	1	2	2	Missing Data	2	2	4	4	2.00
TOTAL	220	225	231	244	249	251	259	268	270	274	274	251.36
Average per city	11.000	11.250	11.550	12.200	12.450	12.550	19.923	13.400	13.500	13.700	13.700	13.20

Table 3: Total number of hospital pharmacist.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Riyadh	137	243	326	333	367	404	394	439	497	504	675	392.64
Makkah	62	60	69	91	105	75	309	121	230	241	244	146.09
Jeddah	48	39	75	104	110	102	Missing Data	105	142	181	191	109.70
Taif	30	27	35	42	53	50	Missing Data	82	90	115	118	64.20
Madina	35	38	43	86	94	83	100	118	137	137	149	92.73
Quseen	38	59	75	82	108	97	83	114	136	135	163	99.09
East Province	50	86	92	109	156	153	276	164	169	191	197	149.36
Alhasa	42	27	34	46	59	54	Missing Data	57	62	82	91	55.40
Heralbatin	7	8	11	26	32	26	Missing Data	26	32	35	46	24.90
Aseer	20	41	53	72	111	110	164	154	163	181	190	114.45
Bisha	12	9	21	13	20	19	Missing Data	25	42	28	40	22.90
Tabouk	20	26	28	44	37	29	35	53	66	76	99	46.64
Hail	28	24	27	31	34	23	25	38	53	58	65	36.91
North Boarder	6	7	13	39	37	30	28	37	40	40	61	30.73
Jazan	41	44	50	93	114	95	104	106	128	135	151	96.45
Najran	7	28	52	53	69	56	59	64	79	99	111	61.55
Albaha	23	10	30	47	40	35	42	53	56	52	63	41.00
Aljouf	17	18	18	31	33	26	42	31	38	50	54	32.55
Alqurayat	11	8	6	18	15	12	Missing Data	18	22	25	28	16.30
Qunfetha	2	2	7	4	7	8	Missing Data	15	24	24	24	11.70
TOTAL	636	804	1065	1364	1601	1487	1661	1820	2206	2389	2760	1,617.55
Average per city	31.8	40.2	53.25	68.2	80.05	74.35	127.7692	91	110.3	119.45	138	84.94

Table 4: Gender Distribution of Pharmacist per region.

	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		Mean	
	F	M	F	M	F	M	F	M	F	M	235	169	F	M	F	M	F	M	F	M	F	M	F	M
Riyadh	94	43	153	90	197	129	223	110	240	127	31	44	235	159	258	181	278	219	276	228	382	293	215.18	147.55
Makkah	33	29	35	25	36	33	32	59	37	68	58	44	121	188	57	64	103	127	109	132	114	130	66.82	81.73
Jeddah	33	15	29	10	52	23	56	48	55	55	16	34	NA	NA	48	57	65	77	84	97	88	103	52.60	51.90
Taif	9	21	7	20	12	23	15	27	20	33	19	64	NA	NA	20	62	20	70	21	94	23	95	16.60	50.90
Madina	6	29	11	27	15	28	15	71	15	79	34	63	28	72	27	91	28	109	32	105	27	122	21.64	72.36
Quseen	5	33	14	45	14	61	16	66	34	74	90	63	22	61	20	94	25	111	18	117	28	135	26.00	76.18
East Province	33	17	47	39	46	46	61	48	89	67	18	36	135	141	95	69	100	69	116	75	110	87	77.27	63.09
Alhasa	12	30	7	20	8	26	11	35	11	48	7	19	NA	NA	19	38	21	41	26	56	25	66	14.70	37.90
Heraibatin	6	1	1	7	5	6	8	18	10	22	8	102	NA	NA	8	18	9	23	10	25	12	34	7.70	25.60
Aseer	8	12	14	27	15	38	7	65	9	102	6	13	26	138	31	123	32	131	42	139	42	148	21.09	85.09
Bisha	9	3	5	4	11	10	0	13	9	11	13	16	NA	NA	3	22	8	34	7	21	9	31	7.40	16.50
Tabouk	9	11	11	15	11	17	21	23	15	22	2	21	13	22	14	39	20	46	21	55	28	71	15.00	31.09
Hail	9	19	6	18	6	21	1	30	2	32	13	17	2	23	5	33	4	49	8	50	11	54	6.09	31.45
North Boarder	2	4	1	6	5	8	17	22	16	21	9	86	11	17	13	24	14	26	15	25	20	41	11.18	25.45
Jazan	2	39	8	36	10	40	9	84	8	106	11	45	11	93	12	94	11	117	18	117	21	130	11.00	81.91
Najran	0	7	11	17	15	37	10	43	17	52	17	18	10	49	8	56	8	71	10	89	13	98	10.82	48.82
Albaha	13	10	3	7	12	18	25	22	22	18	16	10	18	24	23	30	23	33	20	32	22	41	17.91	22.27
Aljounf	10	7	9	9	10	8	15	16	16	17	2	10	20	22	17	14	19	19	23	27	22	32	14.82	16.45
Alquravat	4	7	0	8	0	6	2	16	2	13	2	6	NA	NA	3	15	3	19	5	20	7	21	2.80	13.10
Qumfetha	0	2	0	2	0	7	1	3	3	4	607	880	NA	NA	3	12	7	17	7	17	7	17	63.50	96.10
TOTAL	297	339	372	432	480	585	545	819	630	971	235	169	652	1009	684	1136	798	1408	868	1521	1011	1749	680.1	1,077.4
Average	14.9	17.0	18.6	21.6	24.0	29.3	27.3	41.0	31.5	48.6	49.0	79.6	50.2	77.6	34.2	56.8	39.9	70.4	43.4	76.1	50.6	87.5	38.70%	61.30%

Table 5: Nationality Distribution of Hospital Pharmacist per region.

	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		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
Riyadh	101	36	201	42	258	68	287	46	340	27	367	37	358	36	410	29	450	47	456	48	584	91	346.55	46.09
Makkah	20	42	18	42	19	50	34	57	45	60	40	35	217	92	92	29	175	55	191	50	192	52	94.82	51.27
Jeddah	30	18	23	16	42	33	77	27	90	20	82	20	NA	NA	100	5	137	5	177	4	187	4	94.50	15.20
Taif	16	14	13	14	16	19	21	21	32	21	32	18	NA	NA	73	9	82	8	108	7	111	7	50.40	13.80
Madina	25	10	27	11	28	15	65	21	75	19	71	12	85	15	102	16	118	19	120	17	137	12	77.55	15.18
Quseen	27	11	30	29	51	24	58	24	66	42	59	38	60	23	98	16	110	26	121	14	138	25	74.36	24.73
East Province	44	6	72	14	78	14	101	8	140	16	137	16	240	36	151	13	157	12	177	14	182	15	134.45	14.91
Alhasa	33	9	13	14	31	3	41	5	51	8	51	3	NA	NA	56	1	59	3	78	4	87	4	50.00	5.40
Heraibatin	4	3	6	2	9	2	25	1	30	2	24	2	NA	NA	23	3	30	2	34	1	45	1	23.00	1.90
Aseer	8	12	15	26	27	26	53	19	91	20	99	11	145	19	147	7	156	7	174	7	183	7	99.82	14.64
Bisha	1	11	2	7	1	20	8	5	9	11	9	10	NA	NA	19	6	35	7	22	6	34	6	14.00	8.90
Tabouk	7	13	10	16	12	16	32	12	25	12	22	7	29	6	47	6	57	9	66	10	90	9	36.09	10.55

Table 5: Con

	15	13	12	12	16	11	26	5	28	6	19	4	22	3	35	3	51	2	56	2	63	2	31.18	5.73
Hail	6	0	7	0	12	1	21	18	20	17	20	10	21	7	30	7	31	9	33	7	56	5	23.36	7.36
North Boarder	30	11	32	12	28	22	50	43	75	39	76	19	87	17	102	4	126	2	132	3	148	3	80.55	15.91
Jazan	7	0	7	21	24	28	34	19	60	9	44	12	50	9	56	8	71	8	91	8	103	8	49.73	11.82
Najran	3	20	1	9	7	23	8	39	9	31	10	25	18	24	30	23	33	23	32	20	46	17	17.91	23.09
Albaha	10	7	12	6	5	13	16	15	18	15	14	12	30	12	17	14	24	14	35	15	43	11	20.36	12.18
Aljof	6	5	8	0	6	0	17	1	14	1	11	1	NA	NA	16	2	20	2	23	2	22	6	14.30	2.00
Alqurayat	2	0	2	0	7	0	3	1	5	2	6	2	NA	NA	12	3	18	6	18	6	18	6	9.10	2.60
Qunfetha	395	241	511	293	677	388	977	387	1,223	378	1193	294	1,362	299	1,616	204	1,940	266	2144	245	2469	291	1342.03	303.26
Average	19.8	12.1	25.6	14.7	33.9	19.4	48.9	19.4	61.2	18.9	59.7	14.7	104.8	23.0	80.8	10.2	97.0	13.3	107.2	12.3	123.5	14.6	81.57%	18.43%

Table 6: Gender Distribution of Saudi Pharmacist per region.

	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		Mean	
	F	M	F	M	F	M	F	M	F	M	235	169	F	M	F	M	F	M	F	M	F	M	F	M
Riyadh	71	30	127	74	155	103	191	96	225	115	217	150	213	145	239	171	251	199	249	207	335	249	206.64	139.91
Makkah	11	9	10	8	9	10	10	24	11	34	15	25	83	134	39	53	78	97	88	103	91	101	40.45	54.36
Jeddah	20	10	17	6	31	11	39	38	45	45	47	35	NA	NA	46	54	62	75	82	95	86	101	47.50	47.00
Taif	6	10	4	9	4	12	6	15	10	22	8	24	NA	NA	16	57	17	65	18	90	20	91	10.90	39.50
Madina	4	21	8	19	7	21	13	52	13	62	16	55	19	66	18	84	17	101	20	100	18	119	13.91	63.64
Quseen	3	24	3	27	5	46	7	51	9	57	8	51	8	52	6	92	4	106	6	115	8	130	6.09	68.27
East Province	27	17	40	32	40	38	58	43	83	57	85	52	115	125	91	60	95	62	110	67	103	79	77.00	57.45
Alhasa	7	26	4	9	6	25	8	33	9	42	16	35	NA	NA	18	38	19	40	23	55	23	64	13.30	36.70
Heralbatin	4	0	0	6	4	5	8	17	9	21	6	18	NA	NA	7	16	8	22	9	25	11	34	6.60	16.40
Aseer	0	8	2	13	1	26	3	50	3	88	3	96	13	132	24	123	25	131	35	139	35	148	13.09	86.73
Bisha	0	1	0	2	0	1	0	8	2	7	0	9	NA	NA	0	19	3	32	2	20	4	30	1.10	12.90
Tabouk	1	6	3	7	4	8	18	14	10	15	11	11	11	18	12	35	16	41	16	50	23	67	11.36	24.73
Hail	1	14	1	11	2	14	0	26	0	28	0	19	1	21	4	31	3	48	7	49	10	53	2.64	28.55
North Boarder	2	4	1	6	5	7	10	11	9	11	7	13	7	14	10	20	9	22	11	22	16	40	7.91	15.45
Jazan	0	30	1	31	0	28	1	49	2	73	4	72	6	81	8	94	9	117	15	117	18	130	5.82	74.73
Najran	0	7	0	7	0	24	1	33	8	52	3	41	5	45	4	52	5	66	7	84	10	93	3.91	45.82
Albaha	1	2	0	1	0	7	1	7	3	6	0	10	0	18	4	26	5	28	5	27	8	38	2.45	15.45
Aljof	5	5	4	8	3	2	7	9	8	10	8	6	11	19	7	10	8	16	13	22	13	30	7.91	12.45
Alqurayat	1	5	0	8	0	6	1	16	1	13	1	10	NA	NA	2	14	2	18	4	19	2	20	1.40	12.90
Qunfetha	0	2	0	2	0	7	0	3	1	4	1	5	NA	NA	2	10	2	16	2	16	2	16	1.00	8.10
TOTAL	164	231	225	286	276	401	382	595	461	762	456	737	492	870	557	1,059	638	1,302	722	1422	836	1633	480.98	861.05
Average	14.9	17.0	18.6	21.6	24.0	29.3	27.3	41.0	31.5	48.6	49.0	79.6	50.2	77.6	34.2	56.8	39.9	70.4	43.4	76.1	50.6	87.5	35.84%	64.16%

by Gaither, Caroline A., *et al.* and Gal, Diane *et al.*^[3,8-9] The difference in the number of pharmacists between countries was very high, maybe because of the number of pharmacy colleges, and the importance and impact of the pharmacist were not apparent to the MOH administration. Also, most of the healthcare administrators thought that there is no difference between the pharmacist and pharmacy technician. The hospital pharmacists at MOH showed a significant impact on reducing medication errors, improving patient outcomes and avoiding millions of US dollar annually.^[32-34] The nationality results showed that most of the pharmacists were from Saudi due to the Saudisation plan of MOH. Another parameter of pharmacy workforces could not compare with studies because it missed at MOH statistical books. The number of the pharmacists should increase according to the updated guidelines of MOH pharmacy staff standards to provide full pharmaceutical care services at MOH hospital in Kingdom of Saudi Arabia.

CONCLUSION

Over the previous years, the pharmacist increased especially female pharmacist. The nationality of Saudi pharmacist increases and need more percentage to complete the MOH plan of Saudisation. The detail of pharmacy workforces missed due unreported at MOH statistical books. Pharmacy workforce's investigation everyone to two years is highly recommended at MOH hospitals in Kingdom of Saudi Arabia.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

KSA: Kingdom of Saudi Arabia; MOH: Ministry of Health;

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