Hospital Pharmacist Workforce Analysis in Eleven-Year 2006-2016 at Healthcare Institutions in Saudi Arabia

Yousef Ahmed Alomi^{1*}, Saeed Jamaan Alghamdi², Radi Abdullah Alattyh²

¹The Past General Manager of General Administration of Pharmaceutical Care and The Past Head, National Clinical pharmacy, and pharmacy practice and Pharmacy R and D Administration, Ministry of Health, Riyadh, KSA.

²General Administration of Pharmaceutical Care, Ministry of Health, P.O.BOX 100, Riyadh 11392, Riyadh, KSA.

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*Correspondence to:

Dr. Yousef Ahmed Alomi,

The Past General Manager of General Administration of Pharmaceutical Care, The Past Head, National Clinical pharmacy, and pharmacy practice, Head, Pharmacy R and D Administration, Ministry of Health, P.O.BOX 100, Riyadh 11392, Riyadh, Saudi Arabia..
Email: yalomi@gmail.com

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Abstract

Objectives: 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 at all healthcare organization in eleven years (2006-2016) in Saudi Arabia. **Methods:** It is a retrospective analysis of hospital pharmacist's workforce at all healthcare organization in the past eleven years in the period of 2006-2016 in Saudi Arabia. The analysis was carried out at nine working sectors; Ministry of Health Hospital, University Hospitals, Armed Forces Hospitals, National Gaud Hospitals, Security Forces hospitals, King Faisal Specialist hospital and research center, Royal Commission for Jubail and Yanbu Hospitals, Aramco Hospitals, and Privates hospitals. The analysis included hospital's distribution numbers, the pharmacist distribution numbers, and gender with nationality distribution across Saudi Arabia. **Result:** The total numbers of hospital were 452 with governments sectors was 311 (69 %) while 141 (31%) of private Hospitals. The average numbers of hospitals were (423.45) with a range number of (384-467), and the total number was (467). The average numbers of hospital pharmacists were (4,405.27) with a range number of (3,315-6,559), and the total number was (6,559). The total gender distribution of all hospital pharmacists included male 2,630.6 (59.72%) and female 1,774.6 (40.28%). The total nationality distribution of all hospital pharmacists was Saudi 2,449 (55.59%) and non-Saudi 1,956.2 (44.41 %). Of Saudi hospital pharmacists, 1,509.4 (61.64%) was male, and 939.5 (38.36%) was female. **Conclusion:** The number hospitals are tremendously increased over past years with an emphasis on MOH sector while the number of pharmacists not increased accordingly. The numbers of Saudi pharmacists at MOH hospital were more than other sectors while equal gender distributions. Targeting of Saudisatoin at all health sectors with non-MOH institutions is required.

Key words: Hospital Pharmacist, Workforce, Manpower, Ministry of Health, Saudi Arabia.

INTRODUCTION

There are several sectors provides healthcare services to all population in Saudi Arabia. The healthcare services provided through nine sectors. The Ministry of Health sector, privates sector, and seven non-MOH governmental sectors.^[1] The Ministry of Health coved almost sixty percent of our population while forty percent covered by non-MOH organizations and private sectors.^[1] Every year the MOH published annual statistical book included all hospital pharmacists' workforces in all sectors. The book discussed the pharmacy workforces included nationalities, gender, working site, number of pharmacists and pharmacy technicians. Other of the description of workforces was missed.^[1] Also, several studies published and reported the pharmacy workforce for each sector in a different sector in-depth details.^[2-13] However, it is very hard to find a local study to compare all related sectors of pharmacy workforces, and Gulf and Middle East countries. The objective of this study is to explore the pharmaceutical care workforce at all healthcare hospitals providers 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 Year Books.^[14-24] It included pharmacist or clinical pharmacist's workforces at hospitals in Kingdom of Saudi Arabia. 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 Pharmacists worked at MOH administration or Hospitals or Primary care centers and non-MOH government hospitals including; University Hospitals, Armed Forces Hospitals, National Gaud Hospitals, Security Forces hospitals, King Faisal Specialist hospital and research center, Royal Commission for Jubail and Yanbu Hospitals, Aramco Hospitals, included in the studies. All private hospital included in the study. All community pharmacists or pharmacy technicians excluded from the study. All pharmacists expected to provide pharmaceutical according to ASHP definition and requirements.^[1,25] All type of pharmacy services were based on Saudi Central Board of hospital accreditation, a joint commission of hospital accreditation, ASHP best practice standards, and general administration of the pharmaceutical care strategic plan.^[26-28] All calculations were based on MOH workforce standards of hospitals. All calculation was done used Microsoft Excel version ten. The calculations were per each region for a total of twenty-one regions; hospital's distribution numbers, pharmacists' distribution numbers, the ratio of pharmacists per hospital, the gender distribution of Pharmacists per region, the gender distribution of Saudi Pharmacists per each region across Saudi Arabia.

RESULT

The total numbers of hospitals were 452 hospitals in the kingdom of Saudi Arabia, 270 (59.73%) Ministry of Health hospitals, 141 (31.19%) private hospitals, and 41 (9.08%) non-MOH governmental hospitals. Over the eleven years, the average number of hospitals were (423.45) with a range number of (384-467), and the total number was (467) as explored in Table 1 and 2. The average numbers of hospital pharmacists were (4,405.27) with a range number of (3,315-6,559), and the total number was (6,559). The highest sector had an average numbers of hospital pharmacists were Ministry of health (1,625) followed by Private hospitals (1,225.10) and Armed Forces Hospitals sector (550.18) pharmacists as explore in Table 3. The total gender distribution of all hospital pharmacists included male 2,630.6 (59.72%) and female 1,774.6 (40.28%). The total nationality distribution of all hospital pharmacists was Saudi 2,449 (55.59%) and non-Saudi 1,956.2 (44.41%). Of Saudi hospital pharmacists, 1,509.4 (61.64%) were male, and 939.5 (38.36%) were female as explored in Table 4, 5 and 6.

DISCUSSION

The healthcare care organization consisted of several sections including MOH institution, non-MOH institutions including universities hospitals, Military hospitals, National Guard hospitals, King Faisal Specialist and Research Center, Juba and Yunbu institution, and private hospitals. The MOH established healthcare staff requirements for hospitals and primary care centers including pharmacy services. The staff requirements based on bed capacity for instance physician one per bed and the pharmacy equal to 0.2 pharmacists per bed.^[29] The system of the MOH can calculation the requirements of healthcare staff financially. The annual budget for each hospital distributed based on the requirements standard. Over past years, several hospitals from each sector founded to provide healthcare to the patients in Kingdom of Saudi Arabia. The actual comparisons of workforce of pharmacy yet does not exist. The author tried to explore the pharmacy workforce for all sectors without community pharmacist due to the missed data of MOH year statistical book. The finding showed significant variation between all sectors for instant the MOH hospitals and privates hospitals, very high incremental over the past years while the other sectors not increased much looks like them. Despite the increased hospital's numbers, the number of pharmacists not increased in equal percentages as a comparison with the non-MOH number of the hospital almost stagnant while the number of pharmacists increased on annually. The total number of the pharmacists were lower that's what found by others.^[2,7,8] The demands for pharmacists were high, and a number of the college of pharmacies were low over that past years. The average gender distribution found almost more male pharmacists than female even with Saudi pharmacist; it looked like what founded with Hawthorne, N *et al.* and Gaither, CA. *et al.*^[7,11] While it was lower than in female pharmacists what founded by Gal, D *et al.* in Europe, Western Pacific, Eastern Mediterranean countries, and that is related to the newest graduated pharmacists were male.^[8] The common nationality among all sectors, almost fifty percent distributed of Saudi and Non-Saudi. Also, the Saudi pharmacists were mostly founded in MOH hospital while non-Saudi pharmacists were founded in private hospitals. The significant differences related to the pharmacist wish in the governmental sector more than private sectors due to the significant differences in salary and workload. Also the private wished to recruit non-Saudi pharmacy technician better than Non-Saudi pharmacist due to the lower salary. Others parameters of pharmacy workforces could not compare with studies because it missed at MOH statistical books. The number of pharmacists should increase at MOH hospitals and private organization with the emphasis of Saudization of the pharmacist in private's hospitals.

Table 1: The number and type of hospitals.

	Region	No of Hospitals	Small <100	Medium 100-299	Large 300-399	Large 400- > or = 600	Medical Cities
1	Ministry of health	274	140	95	18	21	2
2	University Hospitals	4	1	0	0	2	1
3	Armed Forces Hospitals	24	8	9	4	2	1
4	Hospitals in the National Guard	5	0	3	0	0	2
5	Hospitals, Security Forces	3	0	0	2	1	0
6	King Faisal Specialist Hospital and Research	2	0	0	1	0	1
7	Hospitals, the Royal Commission for Jubail and Yanbu	2	0	2	0	0	0
8	Aramco Hospitals	1	0	0	1	0	0
9	Private hospitals	152	97	32	5	7	0
	Total	467	246	141	31	33	7

Table 2: Total number of hospitals over eleven years.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Ministry of health	220	225	231	244	249	251	259	268	270	274	274	251.36
University Hospitals	4	4	4	4	4	4	4	4	4	5	4	4.09
Armed Forces Hospitals	24	24	24	24	24	24	24	24	24	24	24	24.00
Hospitals in the National Guard	4	4	4	5	5	5	5	5	5	5	5	4.73
Hospitals, Security Forces	1	2	1	1	1	1	1	3	3	3	3	1.82
King Faisal specialist hospital and research	1	1	2	2	2	2	2	2	2	2	2	1.82
Hospitals, the Royal Commission for Jubail and Yanbu	2	2	2	2	2	2	2	5	2	2	2	2.27
Aramco Hospitals	1	1	1	1	1	1	1	1	1	1	1	1.00
Private hospitals	127	123	113	125	127	130	137	136	141	145	152	132.36
Total	384	386	382	408	415	420	435	448	452	461	467	423.45
Average	76.80	77.20	76.40	81.60	83.00	84.00	87.00	89.60	90.40	92.20	93.40	

Table 3: Total number of pharmacists.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Ministry of health (MOH)	636	804	1065	1,364	1601	1,487	1,661	1,915	2,239	2,389	2,714	1,625.00
University Hospitals (UH)	163	168	174	295	295	298	299	307	313	312	364	271.64
Armed Forces Hospitals (ARH)	351	441	452	473	532	575	575	575	656	711	711	550.18
Hospitals in the National Guard (NGH)	295	309	297	312	391	391	391	399	436	474	593	389.82
Hospitals, Security Forces (HSF)	43	49	42	50	58	58	58	58	90	102	103	64.64
King Faisal specialist hospital and Research (KFSHRC)	177	196	237	187	273	282	298	389	276	293	303	264.64
Hospitals, the Royal Commission for Jubail and Yanbu (HRCJY)	33	20	24	29	29	31	34	27	40	43	49	32.64
Aramco Hospitals (AH)	91	100	99	91	87	86	86	89	84	87	123	93.00
Private hospitals (PH)	1,526	1,412	928	1,225	816	941	981	NA	1,341	1,482	1,599	1,225.10
Total	3,315	3,499	3,318	4,026	4,082	4,149	4,383	3,759	5,475	5,893	6,559	4,405.27
Average	663.00	699.80	663.60	805.20	816.40	829.80	876.60	835.33	1,095.00	1,178.60	1,311.80	

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
MOH	297	339	372	432	480	585	545	819	630	971	607	880	652	1009	717	1198	798	1441	868	1521	982	1732	631.64	993.36
UH	62	101	67	101	80	94	173	122	138	157	125	173	133	166	136	171	145	168	152	160	150	214	123.73	147.91
ARH	112	239	163	278	161	291	173	300	204	328	220	355	220	355	220	355	249	407	276	435	276	435	206.73	343.45
HNG	116	179	118	191	98	199	118	194	170	221	170	221	170	221	186	213	220	216	222	252	284	309	170.18	219.64
HSF	15	28	16	33	18	24	19	31	20	38	20	38	20	38	20	38	35	55	45	57	38	65	24.18	40.45
KFSHRC	104	73	115	81	150	87	101	86	165	108	175	107	187	111	236	153	177	99	186	107	193	110	162.64	102.00
HRCJY	21	12	13	7	12	12	15	14	14	15	15	16	17	17	6	21	16	24	18	25	21	28	15.27	17.36
AH	22	69	22	78	22	77	20	71	18	69	20	66	20	66	20	69	19	65	21	66	40	83	22.18	70.82
PH	417	1109	339	1073	375	553	360	865	323	493	352	589	355	626	0	0	606	735	693	789	779	820	418.09	695.64
TOTAL	1166	2149	1225	2274	1396	1922	1524	2502	1682	2400	1704	2445	1774	2609	1541	2218	2265	3210	2481	3412	2763	3796	1,774.6	2,630.6
Average	129.6	238.8	136.1	252.7	155.1	213.6	169.3	278.0	186.9	266.7	189.3	271.7	197.1	289.9	171.2	246.4	251.7	356.7	275.7	379.1	307.0	421.8	40.28%	59.72%

MOH: Ministry of health, UH: University Hospitals, ARH: Armed Forces Hospitals, HNG: Hospitals in the National Guard, HSF: Hospitals, Security Forces, KFESH: King Faisal specialist hospital and research Hospitals, HRCJY: The Royal Commission for Jubail and Yanbu, AH: Aramco Hospitals, PH: Private hospitals, F: Female, M: Male

Table 5: Nationality Distribution of Hospital Pharmacist per sector.

	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
MOH	395	241	511	293	677	388	977	387	1223	378	1193	294	1362	299	1616	299	1940	299	2144	245	2469	245	1,318.82	306.18
UH	108	55	113	55	122	52	237	58	190	105	203	95	222	77	222	85	232	81	237	75	180	184	187.82	83.82
ARH	186	165	237	204	261	191	254	219	313	219	332	243	332	243	332	243	409	247	470	241	470	241	326.91	223.27
HNG	207	88	213	96	231	66	242	70	290	101	290	101	290	101	317	82	350	86	374	100	480	113	298.55	91.27
HSF	39	4	45	4	37	5	46	4	52	6	52	6	52	6	52	6	80	10	82	20	90	13	57.00	7.64
KFESH	63	114	70	126	74	163	62	125	83	190	85	197	96	202	96	293	108	168	61	232	71	232	79.00	185.64
HRCJY	2	31	0	20	7	17	9	20	7	22	10	21	16	18	18	9	20	20	23	20	31	18	13.00	19.64
AH	24	67	23	77	22	77	18	73	19	68	21	65	21	65	22	67	22	62	24	63	46	77	23.82	69.18
PH	159	1367	164	1248	157	771	148	1077	121	695	92	849	93	888	0	0	159	1182	214	1288	278	1321	158.50	1,066.60
TOTAL	1183	2132	1376	2123	1588	1730	1993	2033	2298	1784	2278	1871	2484	1899	2675	1084	3320	2155	3629	2264	4115	2444	2,449	1,956.2
Average	131.4	236.9	152.9	235.9	176.4	192.2	221.4	225.9	255.3	198.2	253.1	207.9	276	211	297.2	120.4	368.9	239.4	403.2	251.6	457.2	271.6	55.59%	44.41%

MOH: Ministry of health, UH: University Hospitals, ARH: Armed Forces Hospitals, HNG: Hospitals in the National Guard, HSF: Hospitals, Security Forces, KFESH: King Faisal specialist hospital and research Hospitals, HRCJY: The Royal Commission for Jubail and Yanbu, AH: Aramco Hospitals, PH: Private hospitals F: Female, M: Male

Table 6: Gender Distribution of Saudi Pharmacist per sector.																								
	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
MOH	164	231	225	286	276	401	382	595	461	762	456	737	492	870	557	1059	638	1302	722	1422	836	1633	473.55	845.27
UH	47	61	49	64	61	61	153	84	72	118	88	115	103	119	101	121	109	123	116	121	114	66	92.09	95.73
ARH	54	132	68	169	81	180	86	168	108	205	106	226	106	226	106	226	152	257	175	295	175	295	110.64	216.27
HNG	68	139	69	144	71	160	86	156	116	174	116	174	116	174	143	174	179	171	176	198	232	248	124.73	173.82
HSF	12	27	13	32	14	23	16	30	17	35	17	35	17	35	17	35	32	48	32	50	33	57	20.00	37.00
KFSH	31	32	31	39	47	27	28	34	49	34	52	33	60	36	60	36	62	46	41	20	50	21	46.45	32.55
HRCJY	0	2	0	0	3	4	2	7	2	5	4	6	6	10	4	14	5	15	6	17	10	21	3.82	9.18
AH	6	18	5	18	5	17	5	13	5	14	8	13	8	13	10	12	10	12	13	11	23	23	8.91	14.91
PH	29	130	40	124	49	108	51	97	33	88	38	54	38	55	NA	NA	91	68	120	94	164	114	65.30	93.20
TOTAL	411	772	500	876	607	981	809	1184	863	1435	885	1393	946	1538	998	1677	1278	2042	1401	2228	1637	2478	939.5	1,509.4
Average	45.7	85.8	55.6	97.3	67.4	109.0	89.9	131.6	95.9	159.4	98.3	154.8	105.1	170.9	124.8	209.6	142.0	226.9	155.7	247.6	181.9	275.3	38.36%	61.64%

MOH: Ministry of health, UH: University Hospitals, ARH: Armed Forces Hospitals, HNG: Hospitals in the National Guard, HSF: Hospitals, Security Forces, KFSH: King Faisal specialist hospital and research Hospitals, HRCJY: The Royal Commission for Jubail and Yanbu, AH: Aramco Hospitals, PH: Private hospitals F: Female, M: Male

CONCLUSION

After revision of the past eleven years, there was much expanded of Ministry of health and private's hospitals while poor increasing of a number of a pharmacist. Non-MOH governmental hospital not expanded much with an excellent number of pharmacists. The Saudization application was deficient in the private sector, King Faisal Specialist hospital and Aramco hospitals. Targeting of increasing number of pharmacist with complete Saudization is required at MOH, and private hospitals to meet the demand for pharmacy services and reach better patient condition outcomes and increased the patient satisfaction of pharmaceutical care services in all sectors in Kingdom of Saudi Arabia.

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None.

CONFLICT OF INTEREST

None.

ABBREVIATION USED

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

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