Primary Care Centers Pharmacist Workforce Demand in Eleven Years (2006-2016), and Forecasting in Fifteen Years (2016-2030) at Ministry of Health in Saudi Arabia

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Abstract

Objective: The aim of this study is to explore primary care centers pharmacist workforce demand in eleven years (2006-2016) and projection of primary care center pharmacists demand for coming fifteen years (2016-2030) at Ministry of Health in Saudi Arabia. **Methods:** It is a retrospective analysis of eleven years (2006-2016) of MOH primary healthcare center (PCC) pharmacist's workforce demand and projection of primary care center pharmacist's demand for coming fifteen years (2016-2030) at Ministry of Health in Saudi Arabia. All data were derived from Ministry of Health Statistical Year Books over the past eleven years and Ministry of Health (MOH) standard. It included demand pharmacists or clinical pharmacists' workforces at MOH primary healthcare centers. All calculations were based on Ministry of Health workforce standards of primary healthcare center. The calculations were per each region for a total of twenty-one regions, the primary health care center distribution numbers, the ratio of pharmacist per PCC, total number of demand pharmacist per each PCC, the expected number of pharmacist requirement in the coming years 2016-2030, primary healthcare center Pharmacist per each region across Saudi Arabia. **Results:** 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 number of pharmacist per each primary care center pharmacist was (0.077) with a range number of (0.035-0.195). The total average demand primary care center pharmacists were (10,617.18) with range (9,586-11,401) with total number demand was (11,401) primary care center pharmacist. The total demand pharmacists for primary care centers by the year 2030 will be (16,515.79) with range (11,625.00- 16,515.79). **Conclusion:** Over past several years, there was very high demand of primary care pharmacist in Saudi Arabia. There is a high number of pharmacist jobs in the future. Targeting of implementation of Saudi Vision 2030 including pharmacy new vision are highly recommended in Kingdom of Saudi Arabia.

Key words: Parenteral nutrition, Pharmaceutical care, Ministry of health, Saudi arabia.

INTRODUCTION

The pharmacist role at Primary health care centers is critical. The American Society of Health-System identified the Pharmacist duties during practice at primary healthcare centers.^[1] All primary care center expected to implement the concept of pharmaceutical care, pharmacy strategic planning, and Saudi Center for Healthcare accreditation.^[1-3] Several studies investigated pharmacist workforces and other studies reported the demand pharmacy staff either currently or in the future. Those studies conducted in different countries.^[4-15] However, it very hard to find any investigations about primary care center demand analysis and projection of pharmacist in the future in the Kingdom of Saudi Arabia or Gulf, Middle East countries and even vast world countries.^[6,16] The objective of this study is to explore the pharmacist demand in primary healthcare centers currently and projection of the future demand in Saudi Arabia.

METHODS

It is a retrospective analysis of eleven years (2006-2016) of MOH primary healthcare center (PCC) pharmacist workforce demand and pharmacist

projection for coming fifteen years (2016-2030) at Ministry of Health in Saudi Arabia. All data were derived from Ministry of Health statistical Year Books over the past eleven years and Ministry of Health standard.^[17-27] It included a demand pharmacist or clinical pharmacist's workforces at MOH primary healthcare centers. The type of PCC levels services included in the studies. All type of pharmacy services based on Saudi Central Board of hospital accreditation, a Joint Commission of Hospital Accreditation, American Society of Health-System best practice standards, and general administration of the pharmaceutical care strategic plan.^[28-32] All Pharmacists who works at MOH hospitals or 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 primary healthcare center and expected incremental population in Saudi Arabia. The calculations were per each region for a total of twenty-one regions, the primary health care center distribution numbers, the ratio of pharmacist per PCC, total number of demand pharmacists per each PCC, the expected number of

pharmacist's requirement in the coming years 2016-2030 primary healthcare center Pharmacist per each region overall Saudi Arabia. All calculations were done used Microsoft Excel version ten.

RESULTS

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 last update information October 2016 as explored in Table 1. The average number of pharmacist per each primary care center was (0.077) with a range number of (0.035-0.195. The region had highest number of pharmacist per each primary care center was Riyadh (0.196) followed by Jeddah (0.155) and Makkah regions (0.128) as explored in Table 2. The total average demand primary care center pharmacists were (10,617.18) with range (9,586-11,401) with total number demand was (11,401) primary care center pharmacists. The high demand of primary care center pharmacists was in Riyadh regions (2,006) followed by Asser regions (1,227) and Jazan region (886). The total demand pharmacists for primary care centers by year 2030 will be (16,515.79) with range (11,625.00- 16,515.79) as explored in Table 3 and Table 4.

DISCUSSION

Over the past years, there are some new models of primary healthcare services established during healthcare strategic plan of Ministry of health in Kingdom of Saudi Arabia. The implementations consisted of new building of ambulatory care clinic with medical and surgical services and sometimes

add to the emergency department. In addition to supporting services including pharmacy services, laboratories service, and radiology department.^[27] All those sections need healthcare Human Resources with enough qualities and quantities. The pharmacy administration updated several things including PCC pharmacy Skelton, PCC pharmacist competencies, and national pharmacy practice and pharmacy administration programs.^[2,33-35] The pharmacy workforce established released new guidelines for the workforce in 2014-2015 with a number of a pharmacist and added clinical pharmacist. The question raised by the many pharmacist demand to cover all PCC pharmacies. The authors calculated the pharmacy workforce's demand in the current year and coming future years. The finding showed the average rate of pharmacist per primary care centers is very far from the MOH standards with a vast number of a number of pharmacist requirement over the past several years ago. The demand of pharmacists is increased with increased number of primary care centers without much addition or increase of new pharmacist, thus with several years, there was a cumulative high requirement. The best solution to meet the pharmacist demand is to start implementation of Saudi Managed Care Pharmacy. It will meet more than ninety percent of pharmacist requirement at primary care centers. The excepted pharmacist demand at primary care centers was not well investigated. Two studies by Bond CA *et al.*, and Knapp DA calculated the pharmacist's projection in the future based on their functions or duties and sites but the primary care centers were not mentioned.^[6,16] The projection of a number of primary care center pharmacist over fifteen years will expand the problems of employment. The best solution is full implementation of Saudi Vision 2030 with the emphasis on privatization and apply the new vision of

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

	Region	No of Hospitals	No of PCC	No of Hospital Pharmacist	No of PCC Pharmacist	No of Pharmacist at Directorates
	MOH	0	0	0	0	137
1	Riyadh	42	418	497	117	37
2	Makkah	10	84	230	14	19
3	Jeddah	13	88	142	24	12
4	Taif	13	121	90	9	8
5	Madina	20	164	137	26	12
6	Quseen	19	170	136	19	11
7	East Province	20	136	169	21	11
8	Alhasa	11	75	62	10	0
9	Heralbatin	7	36	32	4	4
10	Aseer	20	249	163	32	15
11	Bisha	7	91	42	5	4
12	Tabouk	11	77	66	9	3
13	Hail	13	105	53	5	14
14	North Boarder	9	46	40	3	9
15	Jazan	21	159	128	11	5
16	Najran	12	68	79	7	13
17	Albaha	10	102	56	6	4
18	Aljouf	9	37	38	1	5
19	Alqurayat	4	18	22	2	2
20	Qunfetha	5	37	24	1	5
	Total	276	2325	2760	430	330

Table 2: Total number of pharmacist per PCC.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Riyadh	0.1634	0.2881	0.2095	0.0301	0.0050	0.1696	0.1701	0.1839	0.2799	0.3317	0.3278	0.196
Makkah	0.0000	0.3108	0.2388	0.1310	0.0357	0.1429	0.0394	0.0652	0.1667	0.0964	0.1807	0.128
Jeddah	0.3200	0.2800	0.0250	0.0430	0.0215	0.1183	Missing Data	0.0926	0.2727	0.2500	0.2778	0.155
Taif	0.0096	0.0096	0.0000	0.0268	0.0000	0.0536	Missing Data	0.0250	0.0744	0.1250	0.1157	0.040
Madina	0.0597	0.0299	0.1119	0.0350	0.0000	0.0769	0.0455	0.0519	0.1585	0.1358	0.1543	0.078
Quseen	0.0282	0.1103	0.0000	0.0397	0.0000	0.0397	0.0126	0.0692	0.1118	0.1221	0.1130	0.059
East Province	0.0982	0.1316	0.1190	0.0806	0.0242	0.1032	0.0363	0.0809	0.1544	0.1884	0.2429	0.115
Alhasa	0.0000	0.0000	0.0000	0.0159	0.0000	0.0938	Missing Data	0.0000	0.1333	0.1507	0.2000	0.054
Heralbatin	0.0000	0.0000	0.0000	0.0000	0.0000	0.1579	Missing Data	0.0000	0.1111	0.0750	0.1250	0.043
Aseer	0.0000	0.0000	0.0000	0.0441	0.0000	0.0617	0.0252	0.0546	0.1285	0.2195	0.2450	0.071
Bisha	0.0278	0.1667	0.0694	0.0263	0.0132	0.0658	Missing Data	0.0000	0.0549	0.0864	0.1059	0.056
Tabouk	0.0323	0.0323	0.0299	0.0299	0.0299	0.0735	0.0137	0.0274	0.1169	0.0988	0.1325	0.056
Hail	0.0000	0.0112	0.0215	0.0215	0.0108	0.0833	0.0100	0.0400	0.0476	0.0667	0.0762	0.035
North Boarder	0.0250	0.0256	0.0244	0.0000	0.0000	0.2093	0.0667	0.0667	0.0652	0.0667	0.1277	0.062
Jazan	0.0970	0.0597	0.0940	0.0616	0.0068	0.1164	0.0645	0.0258	0.0692	0.0615	0.0730	0.066
Najran	0.0164	0.0000	0.0161	0.1311	0.0000	0.1475	0.0308	0.0308	0.1029	0.1061	0.1912	0.070
Albaha	0.0000	0.0349	0.0549	0.0323	0.0108	0.0510	0.0495	0.0594	0.0588	0.0577	0.0381	0.041
Aljof	0.0000	0.0357	0.0000	0.0303	0.0303	0.1515	0.0192	0.0286	0.0270	0.0500	0.1190	0.045
Alqurayat	0.3889	0.1765	0.1000	0.0000	0.0000	0.1250	Missing Data	0.0000	0.1111	0.2000	0.1579	0.114
Qunfetha	0.0690	0.0690	0.0000	0.0625	0.0313	0.0303	Missing Data	0.0000	0.0270	0.0811	0.1622	0.048
TOTAL	0.0681	0.1096	0.0804	0.0435	0.0086	0.1038	0.0606	0.0726	0.1429	2.5693	3.16585	0.077
Average per city	0.067	0.089	0.056	0.042	0.011	0.104	0.029	0.045	0.114	0.128	0.158	

Table 3: Total number of PCC pharmacist demand or required.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Riyadh	1,785	1,737	1,841	1,984	1,994	1,958	2,103	2,098	1,992	1,922	2,006	1,947.27
Makkah	375	363	332	417	419	417	1,771	457	411	409	405	525.09
Jeddah	375	375	400	464	465	464	Missing Data	535	431	431	440	438.00
Taif	520	520	525	558	560	558	Missing Data	598	603	596	602	564.00
Madina	669	669	668	714	715	714	767	767	814	804	801	736.55
Quseen	709	725	760	755	755	752	795	792	847	854	880	784.00
East Province	555	558	618	612	617	625	1,235	674	670	676	675	683.18
Alhasa	285	285	340	315	315	319	Missing Data	355	370	360	344	328.80
Heralbatin	145	160	170	190	190	188	Missing Data	205	178	199	198	182.30
Aseer	1,265	1,250	1,135	1,134	1,135	1,134	1,584	1,181	1,231	1,212	1,227	1,226.18
Bisha	179	179	358	379	379	379	Missing Data	395	455	402	422	352.70
Tabouk	310	310	335	334	335	339	365	364	380	399	408	352.64
Hail	440	444	465	465	465	480	500	500	525	525	525	484.91
North Boarder	199	194	204	215	215	212	222	222	227	222	231	214.82
Jazan	666	670	745	730	730	728	775	774	792	892	886	762.55
Najran	304	295	310	304	305	303	324	324	339	330	340	316.18
Albaha	430	428	453	464	464	490	504	504	509	518	524	480.73
Aljof	145	140	165	165	165	165	260	175	185	200	210	179.55
Alqurayat	85	83	100	80	80	80	Missing Data	85	89	74	94	85.00
Qunfetha	145	145	150	159	160	165	Missing Data	175	185	184	183	165.10
TOTAL	9,586	9,530	10,074	10,438	10,463	10,470	11,205	11,180	11,233	11,209	11,401	10,617.18
Average per city	479.30	476.50	503.70	521.90	523.15	523.50	861.92	559.00	561.65	560.45	570.05	558.28

Table 4: Total number of PCC pharmacist demand or required for years (2016-2030).

Region	Years														
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Riyadh	2,120.00	2,173.85	2,229.06	2,285.68	2,343.74	2,403.27	2,464.31	2,526.91	2,591.09	2,656.90	2,724.39	2,793.59	2,864.54	2,937.30	3,011.91
Makkah	415.00	425.54	436.35	447.43	458.80	470.45	482.40	494.65	507.22	520.10	533.31	546.86	560.75	574.99	589.60
Jeddah	450.00	461.43	473.15	485.17	497.49	510.13	523.09	536.37	550.00	563.97	578.29	592.98	608.04	623.48	639.32
Taif	605.00	620.37	636.12	652.28	668.85	685.84	703.26	721.12	739.44	758.22	777.48	797.23	817.48	838.24	859.53
Madina	810.00	830.57	851.67	873.30	895.48	918.23	941.55	965.47	989.99	1,015.14	1,040.92	1,067.36	1,094.47	1,122.27	1,150.78
Quseen	885.00	907.48	930.53	954.16	978.40	1,003.25	1,028.73	1,054.86	1,081.66	1,109.13	1,137.30	1,166.19	1,195.81	1,226.19	1,257.33
East Province	700.00	717.78	736.01	754.71	773.88	793.53	813.69	834.36	855.55	877.28	899.56	922.41	945.84	969.86	994.50
Alhasa	350.00	358.89	368.01	377.35	386.94	396.77	406.84	417.18	427.77	438.64	449.78	461.21	472.92	484.93	497.25
Heralbatin	200.00	205.08	210.29	215.63	221.11	226.72	232.48	238.39	244.44	250.65	257.02	263.55	270.24	277.10	284.14
Aseer	1,245.00	1,276.62	1,309.05	1,342.30	1,376.39	1,411.35	1,447.20	1,483.96	1,521.65	1,560.30	1,599.94	1,640.57	1,682.24	1,724.97	1,768.79
Bisha	425.00	435.80	446.86	458.21	469.85	481.79	494.02	506.57	519.44	532.63	546.16	560.04	574.26	588.85	603.80
Tabouk	415.00	425.54	436.35	447.43	458.80	470.45	482.40	494.65	507.22	520.10	533.31	546.86	560.75	574.99	589.60
Hail	525.00	538.34	552.01	566.03	580.41	595.15	610.27	625.77	641.66	657.96	674.67	691.81	709.38	727.40	745.87
North Boarder	235.00	240.97	247.09	253.37	259.80	266.40	273.17	280.11	287.22	294.52	302.00	309.67	317.53	325.60	333.87
Jazan	890.00	912.61	935.79	959.56	983.93	1,008.92	1,034.55	1,060.82	1,087.77	1,115.40	1,143.73	1,172.78	1,202.57	1,233.11	1,264.43
Najran	340.00	348.64	357.49	366.57	375.88	385.43	395.22	405.26	415.55	426.11	436.93	448.03	459.41	471.08	483.04
Albaha	525.00	538.34	552.01	566.03	580.41	595.15	610.27	625.77	641.66	657.96	674.67	691.81	709.38	727.40	745.87
Aljouf	210.00	215.33	220.80	226.41	232.16	238.06	244.11	250.31	256.66	263.18	269.87	276.72	283.75	290.96	298.35
Aqurayat	95.00	97.41	99.89	102.42	105.03	107.69	110.43	113.23	116.11	119.06	122.08	125.18	128.36	131.62	134.97
Qunfetha	185.00	189.70	194.52	199.46	204.52	209.72	215.05	220.51	226.11	231.85	237.74	243.78	249.97	256.32	262.83
TOTAL	11,625.00	11,920.28	12,223.05	12,533.52	12,851.87	13,178.30	13,513.03	13,856.26	14,208.21	14,569.10	14,939.16	15,318.61	15,707.70	16,106.68	16,515.79

pharmacy practice, this will decrease the burden on all governmental primary care centers. Also, the new vision of pharmacy practice walked toward ambulatory care pharmacy services leads to open number of community pharmacies and more number of pharmacist jobs available in the future.

CONCLUSION

There is high demand for a number of primary care pharmacists in Kingdom of Saudi Arabia. The implementation of the new vision of pharmacy practice during new Saudi Vision 2030 is required. A new model of Saudi Managed Care Pharmacy is appropriate solution to meet the demand of pharmacist currently and in the future.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

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

REFERENCES

- Kimberly A. Galt, Richard F. Demers RNH. ASHP statement on the pharmacist's role in primary care. *Am J Heal Pharm*. 1999;56(16):1665-7.
- Alomi YA. National Primary Care Pharmacist Competency System at MOH in Saudi Arabia. *J Pharm Pharm Sci*. 2016;1(4):1-5.
- The Saudi Central Board For Accreditation of Healthcare Institutions (CBAHI). Primary Healthcare Accreditation Standards. 2011;1-135 p.
- McLeod DC. Contrast in Pharmacy Manpower Planning between the United States and Northern European Countries. *Drug Intell Clin Pharm*. 1986;20:210-2.
- HRSA. A study of the supply and demand for pharmacists [Internet]. Department of Health and Human Services. 2000. p. 100. Available from: www.fip.org/humanresource.
- Bond CA, Raehl CL, Patry R. Evidence-based core clinical pharmacy services in United States hospitals in 2020: services and staffing. *Pharmacotherapy*. 2004;24(4):427-40.
- Bond CA, Raehl CL. Clinical pharmacy services, pharmacy staffing, and adverse drug reactions in United States hospitals. *Pharmacotherapy*. 2006;26(6):735-47.
- Bond CA, Raehl CL. Clinical pharmacy services, pharmacy staffing, and hospital mortality rates. *Pharmacotherapy*. 2007;27(4):481-93.
- Hawthorne N, Anderson C. The global pharmacy workforce: A systematic review of the literature. *Hum Resour Health*. 2009;7(1):48.
- Gal D, Bates I. 2012 FIP Global Pharmacy Workforce Report [Internet]. 2012. Available from: www.fip.org/humanresource.
- Workforce H. Pharmacist Workforce. 2012. — Provincial / Territorial Highlights. 2012.
- Health Workforce Australia. Australia's Health Workforce Series: Pharmacists in Focus. 2014:1-47.
- Gaither CA, Schommer JC, Doucette WR, Kreling DH, Mott DA. 2014. National Pharmacist Workforce Survey. Workforce. 2015. Available from: <http://www.pharmacy.wsu.edu/information/2009.Pharmacist.Workforce.Survey.pdf>
- Robinson E, Shcherbakova N. Assessment of Pharmacy Manpower and Services in New England. *J Pharm Pract*. 2016;29(6):549-55.
- Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: Dispensing and administration - 2014. *Am J Heal Pharm*. 2015;72(13):1119-37.
- Knapp DA. Professionally determined need for pharmacy services in 2020. *Am J Pharm Edu*. 2002;66(4):421-9.
- Health Statistical Year Book 2006. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2007. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2008. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2009. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2010. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2011. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2012. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2013. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2014. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2015. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- Health Statistical Year Book 2016. Saudi Ministry of Health. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>.
- American Society of Hospital Pharmacists. ASHP Statement on Pharmaceutical Care. *Am J Hosp Pharm*. 1993;50:1720-3.
- American Society of Hospital Pharmacists. ASHP Guidelines on a Standardized Method for Pharmaceutical Care. *Am Soc Heal Pharm*. 1996;53(14):1713-6.
- Medication Management (MM). In: National Hospital Standards. 2nd Ed. Saudi Central Board for Accreditation of Healthcare Institutions. 2015;194-211. Available from: <http://www.cbahi.gov.sa>.
- The Joint Commission. Comprehensive Accreditation Manuals. Joint Commission Resources. Available from: <http://www.jcinc.com/store/publications/manuals/>.
- Alomi YA, Alghamdi SJ, Alattyh RA. Strategic Plan of General Administration of Pharmaceutical Care at Ministry of Health in Saudi Arabia 2012–2022. *J Pharm Pharm Scien*. 2015;1(3):1-8.
- Alomi YA. National Pharmacy Practice Programs at Ministry of Health in Saudi Arabia. *J Pharm Pharm Scien*. 2015;1(2):17-8.
- Alomi YA. National Pharmacy Administration Programs at Ministry of Health in Saudi Arabia. *BAOJ Pharm Sci*. 2015;1(9).
- Alomi YA. Primary Care Center Pharmacy Manpower New Guidelines in Saudi Arabia. *J Pharmacol Clin Res*. 2016;1(1).

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