


Demand for Pharmacy Technician Workforce at Primary Healthcare Centers during the Past 12 Years (2006–2017) and in the Future (2018–2030) in Saudi Arabia

Yousef Ahmed Alomi* , The Former General Manager of General Administration of Pharmaceutical Care, The Former Head, National Clinical Pharmacy and Pharmacy Practice, The Former Head, Pharmacy R and D Administration, Ministry of Health, Riyadh, SAUDI ARABIA.

Saeed Jamaan Alghamdi, General Administration of Pharmaceutical Care, Ministry of Health, Riyadh, SAUDI ARABIA.

Radi Abdullah Alattyh, General Administration of Pharmaceutical Care, Ministry of Health, Riyadh, SAUDI ARABIA.

Correspondence:

Dr. Yousef Ahmed Alomi, The Former General Manager of General Administration of Pharmaceutical Care, The Former Head, National Clinical pharmacy and pharmacy practice, The Former Head, Pharmacy R and D Administration, Ministry of Health, Riyadh, SAUDI ARABIA.

Phone no: +966504417712

E-mail: yalomi@gmail.com

ABSTRACT

Objective: To explore the demand of pharmacy technician workforce at Ministry of Health's (MOH) Primary Healthcare Centers (PHCs) over the past 12 years (2006–2017) and in the future (2018–2030) in the Kingdom of Saudi Arabia. **Methods:** This is a retrospective analysis of the demand of MOH's pharmacy technician workforce during the past 12 years (2006–2017) and in the future (2018–2030). All data were derived from the MOH's *Statistical Year Books* and any missing information regarding the pharmacy technician workforce will be estimated through allied healthcare professionals' data from each region including data on gender or nationality. It included pharmacy technician and excluded all types of pharmacists or clinical pharmacist's workforces at MOH hospital setting. All calculations were based on MOH's workforce standards of PHCs and updated literature. All calculations were performed using Microsoft Excel version 10.

Results: The demand for number pharmacy technicians based on the pharmacist: pharmacy technicians in the ratio standard (1:3) was (4–1,392) with an average number of (608.92) pharmacy technicians required. The demand for number of pharmacist: pharmacy technicians in the ratio standard (1:4) was (37,453–46,058) with an average number of (41,611.17) pharmacy technicians required. While the demand for pharmacist: pharmacy technicians in the ratio standard (1:2) was (18,281–22,218) with an average of (20,159.67). The number of pharmacist: pharmacy technicians required in the future based on the ratio standard (1:3) was 27,867–34,138 with an average number of (30,885.42) pharmacy technicians required. In the future (2018–2030), the pharmacist: pharmacy technicians based on the ratio standard (1:4) was (47,600–64,317) with an average of (54,895.23) pharmacy technicians required. However, the pharmacist: pharmacy technicians based on the ratio standard of (1:2) was (23,154–31,286) with an average number of (26,689.30) pharmacy technicians required. The number of pharmacist: pharmacy technician required based on the ratio standard (1:3) was (35,377–47,802) with an average number of (40,792.27) pharmacy technicians required. **Conclusion:** In this study, the demands and future forecasting of pharmacy technician workforces was determined. The pharmacist to pharmacy technician ratio should be standardized. Pharmacy technicians may be utilized at community pharmacies in the future. Periodic analysis of demand and forecasting at PHCs is highly recommended in Saudi Arabia.

Keywords: Demand, Forecasting, Primary Healthcare Center, Pharmacy Technician, Workforce, Ministry of Health, Saudi Arabia.

Received: 02-03-2019;

Accepted: 17-05-2019

Copyright: © the author(s), publisher and licensee International Journal of Pharmacology and Clinical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 License

INTRODUCTION

There are two types of pharmacy jobs: the clinical pharmacist's job and the more advanced specialized clinical pharmacist's job. The other type jobs called supportive personal of pharmacy or pharmacy technician. Each type of job has specific functions and roles in the healthcare system.^[1-3]

The working standard of each job should ideally provide cost-effective services to patients. Several state board of pharmacy in the United States released different ratios of pharmacist to pharmacy technicians required starting from 1:2 to 1:4 and more.^[4] These ratios have been established based on the workload and the services provided to the patients.^[1] The MOH released the pharmacist workforce required for hospitals and PHCs.^[5,6] Local investigation discussed the demand of hospital pharmacist based on MOH standards.^[7,8] However, the standard requirement for pharmacy technician at hospitals and PHCs has

not been prepared yet. In addition, the ratio of pharmacist to pharmacy technician workforce and the demand of pharmacy technician and forecasting is not ready in Saudi Arabia, Gulf, or in Middle Eastern countries. Therefore, in this study, we aimed to explore the analysis of pharmacy technician demand over the past 12 years and conduct forecasting in the future within the years 2030.

METHODS

This is a retrospective analysis of 12 years (2006–2017) of MOH pharmacy technician workforce demand and future forecasting (2018–2030) at MOH's organization practice. All data have been derived from the MOH's *Statistical Year Books* and any missing information of pharmacy technician workforce will be estimated through allied

Access this article online



www.ijpcs.net

DOI:
10.5530/ijpcs.2019.8.30

healthcare professionals data at each region including gender or nationality.^[9-20] It included pharmacy technicians and excluded all types of pharmacist or clinical pharmacist workforce at MOH hospital setting. All types of hospitals and PHCs were included in the study with the involvement of general, public, pediatric, maternity and psychiatric hospitals. All specialized centers such as cardiac, oncology and dental centers were also included in this study. All pharmacy technicians were expected to provide pharmaceutical information according to the ASHP's definition and requirements. All types of pharmacy services were based on Saudi Central Board of Hospital Accreditation, Joint Commission on Hospital Accreditation, ASHP best practice standards and general administration of the pharmaceutical care strategic plan.^[21-25] All pharmacy technician works at MOH's PHCs or administration or non-MOH government hospitals and PHCs excluded from the studies. All private hospitals and community pharmacists were excluded from the study. All calculations were based on MOH's workforce standards of PHC and updated literature.^[7,26] All calculations were performed by using Microsoft Excel version 10.

RESULTS

Over the past 12 years (2006–2017), an average population of KSA was (28,283,424.58) and the range was (23,678,849–32,552,3360). The MOH serve sixty percent of the KSA pollution and accounted for an average (16,970,054.78) and range (14,207,309–19,531,402). The number of PHC pharmacists has increased from (131 to 468) with an average number of (227.67) pharmacists, with an increase of (3.57) fold over the past 12 years and increments of (0.297) annually. While the number of pharmacy technicians has increased from (891 to 1,623) with an average number of (1,291.92) pharmacy technicians. It increased of (1.82) fold over the past 12 years and increments of (0.151) annually. The demand for pharmacy technicians is based on the actual number of pharmacies and the ratio of the pharmacist: pharmacy technicians. The demand pharmacy technician based on the ratio of (1:4) was (77–1,374), with an average number of (381.25) pharmacy technicians required. While with a ratio of (1:2), the number of pharmacy technicians required was (215–1,410), with an average number of (1836.58) pharmacy technicians required. The number of pharmacy technicians required in the ratio of (1:3) was (4–1,392), with an average number of (608.92) pharmacy technicians required (Table 1).

The number of PHC pharmacy technicians required based on the optimum pharmacy and pharmacist: pharmacy technician ratio of (1:4)

was (37,453–46,058) with an average number of (41,611.17) pharmacy technicians required. For the ratio of (1:2), the number of pharmacy technicians required was (18,281–22,218) with an average number of (20,159.67) pharmacy technicians required. The number of pharmacy

technicians required in the future forecast in the ratio of (1:3) was (27,867–34,138), with an average number of pharmacy technicians required was (30,885.42) (Table 2). The number of pharmacy technicians in the future years (2018–2030) is based on the optimum number

Table 1: The demand for pharmacy technicians based on the actual primary healthcare center pharmacist (2006–2017).

years	total of actual pharmacist	total of pharmacy technician	actual pharmacy Technical (1:4)	no demand actual pharmacy Technical	actual pharmacy Technical (1:2)	no demand actual pharmacy Technical	actual pharmacy Technical (average)	no demand actual pharmacy Technical
2006	131	891	524	367	262	-629	393	-498
2007	211	637	844	-207	422	-215	633	-4
2008	163	729	652	77	326	-403	489	-240
2009	91	1,043	364	679	182	-861	273	-770
2010	18	1,446	72	1,374	36	-1,410	54	-1,392
2011	219	1,681	876	805	438	-1,243	657	-1,024
2012	137	1,463	548	915	274	-1,189	411	-1,052
2013	164	1,377	656	721	328	-1,049	492	-885
2014	326	1,524	1,304	220	652	-872	978	-546
2015	374	1,499	1,496	3	748	-751	1,122	-377
2016	430	1,590	1,720	-130	860	-730	1,290	-300
2017	468	1,623	1,872	-249	936	-687	1,404	-219
Average	227.67	1,291.92	910.67	381.25	455.33	-836.58	683.00	-608.92

Table 2: The demand for pharmacy technicians or the requirement based on the optimum primary healthcare center pharmacist (2006–2017).

years	no PCC	optimum hospital pharmacist	optimum hospital pharmacy Technical(1:4)	no demand optimum hospital pharmacy Technical	optimum hospital pharmacy Technical(1:2)	no demand optimum hospital pharmacy Technical	optimum hospital pharmacy Technical(average)	no demand optimum hospital pharmacy Technical
2006	1,925	9,586	38,344	-37,453	19,172	-18,281	28,758	-27,867
2007	1,925	9,530	38,120	-37,483	19,060	-18,423	28,590	-27,953
2008	2,028	10,074	40,296	-39,567	20,148	-19,419	30,222	-29,493
2009	2,094	10,438	41,752	-40,709	20,876	-19,833	31,314	-30,271
2010	2,094	10,463	41,852	-40,406	20,926	-19,480	31,389	-29,943
2011	2,109	10,470	41,880	-40,199	20,940	-19,259	31,410	-29,729
2012	259	11,205	44,820	-43,357	22,410	-20,947	33,615	-32,152
2013	2,259	11,180	44,720	-43,343	22,360	-20,983	33,540	-32,163
2014	2,281	11,233	44,932	-43,408	22,466	-20,942	33,699	-32,175
2015	2,282	11,209	44,836	-43,337	22,418	-20,919	33,627	-32,128
2016	2,325	11,401	45,604	-44,014	22,802	-21,212	34,203	-32,613
2017	2,361	11,920.28	47,681	-46,058	23,841	-22,218	35,761	-34,138
Average	1,995.17	10,725.77	42,903.08	-41,611.17	21,451.58	-20,159.67	32,177.33	-30,885.42

Table 3: The future demand for pharmacy technicians based on the optimum primary healthcare center pharmacist (2018–2030).

years	optimum hospital pharmacist	optimum hospital pharmacy Technical (1:4)	no demand optimum hospital pharmacy Technical	optimum hospital pharmacy Technical (1:2)	no demand optimum hospital pharmacy Technical	optimum hospital pharmacy Technical(average)	no demand optimum hospital pharmacy Technical
2018	12,223.05	48,892	-47,600	24446	-23,154	36,669	-35,377
2019	12,533.52	50,134	-48,809	25067	-23,742	37,601	-36,276
2020	12,851.87	51,407	-50,049	25704	-24,345	38,556	-37,197
2021	13,178.30	52,713	-51,320	26357	-24,964	39,535	-38,142
2022	13,513.03	54,052	-52,624	27026	-25,598	40,539	-39,111
2023	13,856.26	55,425	-53,960	27713	-26,248	41,569	-40,104
2024	14,208.21	56,833	-55,331	28416	-26,915	42,625	-41,123
2025	14,569.10	58,276	-56,736	29138	-27,598	43,707	-42,167
2026	14,939.16	59,757	-58,178	29878	-28,299	44,817	-43,238
2027	15,318.61	61,274	-59,655	30637	-29,018	45,956	-44,337
2028	15,707.70	62,831	-61,170	31415	-29,755	47,123	-45,463
2029	16,106.68	64,427	-62,724	32213	-30,511	48,320	-46,618
2030	16,515.79	66,063	-64,317	33032	-31,286	49,547	-47,802
Average	14,102.97	56,411.87	-54,895.23	28,205.94	-26,689.30	42,308.91	-40,792.27

of pharmacies and pharmacists available. The pharmacist: pharmacy technician ratio of (1:4) was (47,600–64,317), with an average number of (54,895.23) pharmacy technicians required. While in the ratio of (1:2), the number of pharmacy technicians in the forecast was (23,154–31,286) with an average number of (26,689.30) pharmacy technicians required. The number of pharmacy technicians in the ratio of (1:3) was (35,377–47,802), with an average number of (40,792.27) pharmacy technicians required (Table 3).

DISCUSSION

In 2014, the general administration of pharmaceutical care released the first pharmacist workforce standard requirements for PHCs in the KSA.^[27] The number of pharmacists depends on the level of PHCs of serving populations. However, the average number of pharmacists was almost five per center. However, the number of pharmacy technician standards at PHCs not existed up to know in the Saudi Arabia. There was a high demand for pharmacists at the PHCs during regulars days or even during hajj period.^[7,28,29] Those previous studies declared had a few numbers of pharmacist despite a high demand for a pharmacists. Thus, the number of pharmacists was not exceed 0.25 FTE pharmacist per PHC in those studies.^[7,29] However, the actual number of pharmacy technicians is almost four times the number of pharmacists. According to the results of this

study, the demand for pharmacy technicians is based on the actual number of pharmacists with different ratios of pharmacist to pharmacy technicians, not exceeding more than 2000 pharmacy technicians at all PHCs. The findings of this study showed that the demand for pharmacy technicians is based on the optimum calculation of pharmacists in the increments of 25-, 12- and 18-fold increments for pharmacist: pharmacy technician's ratio of (1:4), (1:2) and (1:3) respectively. The future demand for pharmacy technician based on the future optimum pharmacist: pharmacy technician ration of (1:4), (1:2) and (1:3) was 26–35 fold, 12–17 fold and 19–26 fold increments respectively during years of (2018–2030). From this result, we can say that there will be a significant demand for pharmacy technicians in the future. However, most of the roles and responsibilities of pharmacists and pharmacy technicians were not fully implemented at the PHCs. The author suggests to revise their job description in order to implement the duties of all pharmacy staff. In addition, the demand of pharmacy technicians need several years to reach the optimum level of pharmacy technician requirements. Therefore, the authors suggest to start a college to teach pharmacy technicians with a new curriculum with a duration of 1 year to graduate general pharmacy technician or 2 years curriculum to graduate clinical pharmacy technician. The new college of the pharmacy technician can accept the new graduates of secondary schools

or students of bachelors of sciences (chemistry, biology and physics). This can help to achieve the target demand for pharmacy technician for the future. The updated pharmacy strategic plan implemented the Saudi-Managed Care Pharmacy system and might substitute the significant number of pharmacy technician at PHCs from private community pharmacies.^[30,31] Therefore, the new generation of pharmacy technicians can be utilized at community pharmacies with the new job description of general and clinical pharmacy technician. This study is the first that is conducted in the KSA and the Gulf or Middle Eastern countries. Periodically the analysis of pharmacy technician workforce at PHCs or community pharmacies in the future should be conducted once in every 2–4 years in Saudi Arabia.

CONCLUSION

The investigation of pharmacy technician workforces with an emphasis on demand and forecasting in the future is first done locally and Middle East. The pharmacy manpower of pharmacy technician and the ratio of pharmacist to pharmacy technician at primary healthcare should be standardized. Further studies demand to be investigated with actual demand based on the workload at PHCs is highly recommended in the KSA.

ACKNOWLEDGMENT

None.


CONFLICT OF INTEREST

None.

ABBREVIATIONS

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

ORCID ID

Yousef Ahmed Alomi  <https://orcid.org/0000-0003-1381-628X>

REFERENCES

1. Siden R, Tamer HR, Skyles AJ, Dolan CS, Propes DJ, Redic K. Survey to assess the role of pharmacy technicians and nonpharmacist staff in the operation of research pharmacies. *Am J Heal Pharm.* 2014;71(21):1877-89.
2. Desselle SP, Holmes ER. Results of the 2015 National Certified Pharmacy. *Am J Heal Pharm.* 2017;74(13):981-91.
3. Koehler T, Brown A. A global picture of pharmacy technician and other pharmacy support workforce cadres. *Res Soc Adm Pharm.* 2017;13(2):271-9.
4. Alkhateeb FM, Shields KM, Broedel-zaugg K, Bryan A, Snell J. Credentialing of pharmacy technicians in the USA. *Int J Pharm Pract.* 2011;19(4):219-27.

5. Ahmed AY, Pharm B, Clin PM. A new Guidelines on Hospital Pharmacy Manpower in Saudi Arabia. *J Pharm Pract Community Med.* 2016;2(22):30-1.
6. Alomi YA. Primary Care Center Pharmacy Manpower New Guidelines in Saudi Arabia. *J Pharmacol Clin Res.* 2016;1(1):10-13.
7. Alomi YA, Alghamdi SJ, Alattyh RA. 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. *J Pharm Pract Community Med.* 2018;4(1s):S121-5.
8. Alomi YA, Alghamdi SJ, Alattyh RA, Ministry A, Box PO. The Demand of Hospital Pharmacist Workforce in Past Eleven Years (2006-2016) and Forecasting Future Fifteen Years (2016-2030) at all Healthcare Institutions in Saudi Arabia. *Journal of Pharmacy Practice and Community Medicine.* 2018;4(1):97-102.
9. Saudi Ministry of Health. Health Statistical Year Book 2017. Saudi Ministry of Health. 2017.
10. Saudi Ministry of Health. Health Statistical Year Book 2016. Saudi Ministry of Health. 2016.
11. Saudi Ministry of Health. Health Statistical Year Book 2006. Saudi Ministry of Health. 2006.
12. Saudi Ministry of Health. Health Statistical Year Book 2007. Saudi Ministry of Health. 2007.
13. Saudi Ministry of Health. Health Statistical Year Book 2008. Saudi Ministry of Health. 2008.
14. Saudi Ministry of Health. Health Statistical Year Book 2009. Saudi Ministry of Health. 2009.
15. Saudi Ministry of Health. Health Statistical Year Book 2010. Saudi Ministry of Health. 2010.
16. Saudi Ministry of Health. Health Statistical Year Book 2011. Saudi Ministry of Health. 2011.
17. Saudi Ministry of Health. Health Statistical Year Book 2012. Saudi Ministry of Health. 2012.
18. Saudi Ministry of Health. Health Statistical Year Book 2013. Saudi Ministry of Health. 2013.
19. Saudi Ministry of Health. Health Statistical Year Book 2014. Saudi Ministry of Health. 2014.
20. Saudi Ministry of Health. Health Statistical Year Book 2015. Saudi Ministry of Health. 2015.
21. American Society of Hospital Pharmacists. ASHP Statement on Pharmaceutical Care. *Am J Hosp Pharm.* 1993;50:1720-3.
22. American Society of Health-System Pharmacists. ASHP guidelines on a standardized method for pharmaceutical care. *Am J Heal Pharm.* 1996;53(14):1713-6.
23. Saudi Center Board for Accreditation for Healthcare Institutions (CBAHI). Medication Management (MM). In: National Hospital Standards. 2nd Editio. Saudi Central Board for Accreditation of Healthcare Institutions. 2016;194-211.
24. The Joint Commission. 2016 Comprehensive Accreditation Manuals. Joint Commission Resources. 2016.
25. Alomi YA, Alghamdi SJ, Alattyh RA. Strategic Plan of General Administration of Pharmaceutical Care at Ministry of Health in Saudi Arabia 2012-2022. *JPharm Pharm Scien.* 2015;1(13):1-8.
26. Alomi YA, Alghamdi SJ, Alattyh RA. Primary Care Center Pharmacist 's Workforce in Eleven-Year 2006-2016 at Ministry of Health in Saudi Arabia. *J Pharm Pract Community Med.* 2018;4(1s):S126-31.
27. Alomi YA. Primary Care Center Pharmacy Manpower New Guidelines in Saudi Arabia. *J Pharmacol Clin Res.* 2016;1(1):1-3.
28. Alomi YA, Alhennawi K, Khayayt N. Pharmacy Workload and Workforce Requirements at MOH Primary Health Care Center during Ten years Mass Gathering Hajj (2006-2015) in Makah Region, Saudi Arabia. *J Pharm Pract Community Med.* 2017;3(4s):S61-6.
29. Alomi YA, Alhennawi K, Khayayt N. Pharmaceutical Care Workload and Human Resources Requirements at MOH Primary Health Care Center Over Nine years Mass Gathering Hajj (2006-2014) in Al-Medina Region, Saudi Arabia. *J Pharm Pract Community Med.* 2017;3(4s):S56-60.
30. Alomi YA, Alghamdi SJ, Alattyh RA, Elshenawy RA. The Evaluation of Pharmacy Strategic Plan in Past 2013-2016 and Forecasting of New Vision 2030 at Ministry of Health in Saudi Arabia. *J Pharm Pract Community Med.* 2018;4(2):93-101.
31. Alomi YA, Alghamdi SJ, Alattyh RA. Saudi Managed Care Pharmacy (SMCP): New Initiative System of MOH Prescriptions Dispensed Through Community Pharmacies. *J Pharm Pract Community Med.* 2017;3(3):145-53.