

Forecasting (2018-2030) and the Demand of Clinical Pharmacy Technician Workforce at Over Twelve Years (2006-2017) in Saudi Arabia

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ABSTRACT

Background: The workforce of clinical pharmacy technician is one the elements of pharmacy strategic plan in Saudi Arabia. **Objectives:** The purpose of this study is to explore the demand clinical pharmacy technician's workforce at Ministry of Health (MOH) hospitals and primary health care centers over the past twelve years (2006-2017) and forecasting during the years (2018-2030) in the kingdom of Saudi Arabia.

Methods: It is a retrospective analysis of twelve years (2006-2017) of MOH hospitals, Primary Health Care Center (PHCs) of the pharmacy technician's workforce and forecasting for future years (2018-2030). All data were derived from the Ministry of Health statistical year books and any missing appropriate information about pharmacy technician's workforce that will be estimated through allied healthcare professional's data in each region including gender. It included all types of pharmacy technicians included in the study while excluded all pharmacists or clinical pharmacist's workforce at MOH intuitions. All calculations were based on MOH workforce standards of hospitals or PHCs updated literatures. All calculation was done using Microsoft Excel version ten.

Results: The total average of hospitals was 253.92 in the kingdom of Saudi Arabia. The total average demand of clinical pharmacy technician at MOH hospitals will be (4,579.08) over twelve years (2006-2017) with a range (2,899 to 6,619). The total average demand of clinical pharmacy technician at primary healthcare centers will be (1,303) over twelve years (2006-2017) with a range (891 to 1,623). The total average demand of clinical pharmacy technician at hospital forecasting will be (10,271.34) over thirteen years (2008-2030) with a range (8,797.44 to 11,887.11). The total average demand of clinical pharmacy technician at primary healthcare centers forecasting will be (14,270.87) over thirteen years (2018-2030) with a range (12,223.05 to 16,515.79).

Conclusion: The Ministry of Health hospitals and primary care centers sectors will be with the highest demand for clinical pharmacy technician in the future. The ratio of pharmacist to clinical pharmacy technician needs to be standardized at hospitals and primary healthcare services. Further, the analysis of the clinical pharmacy technician workforce is required in the kingdom of Saudi Arabia.

Keywords: Demand, Forecasting, Clinical Pharmacy technician, Workforces, Ministry of Health, Saudi Arabia.

INTRODUCTION

The clinical pharmacy concept started overseas in the 1960s, while locally started in the late 1970s and mid of 1980s.^[1] The new concept of pharmaceutical care stated in the 2000s and most of the college of pharmacy converted from bachelors to Pharm.D degree as appropriate to meet to the requirements of the implementation of pharmaceutical care in the United States of America.^[2] In Saudi Arabia, most of the college of pharmacies converted to Pharm.D degree in period 2005-2010 and residency program of pharmacy practice at early of the 2000s.^[3] In early of the 2010s, the pharmacy strategic plan started with an update of a new vision in late of 2010s.^[4,5] After years of 2016, several publications discussed the pharmacy workforce in the kingdom of Saudi Arabia as general of mass gatherings hajj period.^[6-8] The authors discussed hospital and primary health care centers and including clinical pharmacy workforce.^[9] However, litterateur did not discuss that has included the phar-

macy technician workforce as a general clinical pharmacy technician.^[10] In those litterateurs the recommended high number of a clinical pharmacist, the number it will take some time to reach the optimum clinical pharmacy staff. As results, another solution demand until reaching the target number to help the clinical pharmacist with their work as a trained pharmacy technician. Several investigations released to the experiences of implementation of a pharmacy technician with clinical oriented and works as a helper to the clinical pharmacist with some clinical duties.^[11-15] In Saudi Arabia, the workforce of clinical pharmacy technician should declare with a target of new Saudi vision 2030. The study did not investigate in the locally of Gulf and Middle countries based on the level of our knowledge. The aim of the study to explore clinical pharmacy technician during the past twelve years (2006-2017) and forecasting in the thirteen years in the future (2018-2030) in the kingdom of Saudi Arabia.

METHODS

It is a retrospective analysis, demand of twelve years (2006-2017) of MOH hospitals, Primary Health Care Center (PHCs) of the pharmacy technician's workforce and forecasting during the years (2030). All data was derived from the Ministry of Health Statistical Year Books and any missing appropriate information about pharmacy technician workforce, that will be estimated through allied healthcare professionals data at each region, including gender.¹⁶⁻²⁷ It included all types of pharmacy technicians included in the study while excluded all pharmacists or clinical pharmacist's workforces at MOH intuitions (Medical affairs and hospitals or primary health care centers). All pharmacy technicians expected to provide pharmaceutical according to 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 administration of the pharmaceutical care strategic plan.^{4,28-31} All pharmacy technician's works at MOH hospitals or administration or non-MOH government hospitals and primary care centers excluded from the studies. All private hospital or community pharmacy technician was excluded from the study. All calculations were based on MOH workforce standards of hospitals or PHCs updated literatures.³²⁻³⁴ All

calculation was done used Microsoft Excel version ten. The calculations were in the hospitals and primary health care center distribution numbers in each year, the annual pharmacy technician distribution numbers, the ratio of clinical pharmacy technician's per pharmacist (1:1) forecasting in the future for hospitals and primary care center at overall Saudi Arabia.

RESULTS

The total average of hospitals was 253.92 in the kingdom of Saudi Arabia. The total number of pharmacy technician at all sectors hospitals, primary healthcare centers and medical affairs administration increased from 4,289 to 8,373 over twelve years with 1.96-fold increments (2006-2017). The total number of pharmacy technician at PCC increased from 891 to 1,623 over twelve years with 1.82-fold increments (2006-2017).

The total average demand of clinical pharmacy technician in MOH hospitals will be (4,579.08) over twelve years (2006-2017) with a range (2,899 to 6,619). The number of male or female clinical pharmacy technician worked at hospitals demanded from (1,449.5 to 3,309.5) with an average (4,579.08). The total average demand of clinical pharmacy technician at primary healthcare centers will be (1,303) over twelve years (2006-2017) with a range (891 to 1,623). The number of male or female clinical pharmacy technician worked at hospitals

demanded from 445.5 to 811.5 with an average (651.50) (Table 1).

The total average demand of clinical pharmacy technician at hospital forecasting will be (10,271.34) over thirteen years (2008-2030) with a range (8,797.44 to 11,887.11). The number of male or female clinical pharmacy technician worked at hospital forecasting from 4,398.7 to 5,943.6 with an average (5,135.68). The total average demand of clinical pharmacy technician at primary healthcare centers forecasting will be (14,270.87) over thirteen years (2018-2030) with a range (12,223.05 to 16,515.79). The number of male or female clinical pharmacy technician worked at primary health care centers forecasting from (6,111.5 to 8,257.9) with an average (7,135.44) annually (Table 2).

DISCUSSION

The general administration of pharmaceutical care released the pharmacy strategic plan and updated one in 2013 and 2016 respectively and contained several clinical pharmacy initiatives and projects.^{4,5} The clinical pharmacy workforce standard was a part of the plan. The clinical pharmacy workforce in hospitals was 0.08 clinical pharmacists per bed and one clinical pharmacist at each primary care center in addition to two specialized clinical at each region.^{35,36} However, the clinical pharmacy technician standard has not determined

Table 1: Estimated Clinical Pharmacy Technicians general workforce's descriptions (2006-2017) (Hospital-PHCs.)

Year	No of Hospital	total hospital pharmacy Technician	total hospital clinical pharmacy Technician (Hospital Pharmacist-Clinical pharmacy technicians 1:1)	total hospital Male clinical pharmacy Technical	total hospital female clinical pharmacy Technical	No of PHCs	total of PHCs pharmacy Technical	total PHCs clinical pharmacy Technician (PHCs Pharmacist-Clinical pharmacy technicians 1:1)	total hospital Male clinical pharmacy Technical	total hospital female clinical pharmacy Technical
2006	220	2,899	2,899	1,449.5	1,449.5	1925	891	891	445.5	445.5
2007	225	2,736	2,736	1,368.0	1,368.0	1925	767	767	383.5	383.5
2008	231	2,762	2,762	1,381.0	1,381.0	2028	729	729	364.5	364.5
2009	244	3,019	3,019	1,509.5	1,509.5	2094	1,043	1,043	521.5	521.5
2010	249	4,114	4,114	2,057.0	2,057.0	2094	1,446	1,446	723.0	723.0
2011	251	4,492	4,492	2,246.0	2,246.0	2109	1,681	1,681	840.5	840.5
2012	259	4,643	4,643	2,321.5	2,321.5	2259	1,466	1,466	733.0	733.0
2013	268	4,768	4,768	2,384.0	2,384.0	2259	1,377	1,377	688.5	688.5
2014	270	6,172	6,172	3,086.0	3,086.0	2281	1,524	1,524	762.0	762.0
2015	274	6,297	6,297	3,148.5	3,148.5	2282	1,499	1,499	749.5	749.5
2016	274	6,428	6,428	3,214.0	3,214.0	2325	1,590	1,590	795.0	795.0
2017	282	6,619	6,619	3,309.5	3,309.5	2361	1,623	1,623	811.5	811.5
Average	253.92	4,579.08	4,579.08	2,289.54	2,289.54	2,161.83	1,303.00	1,303.00	651.50	651.50

Table 2: Clinical Pharmacy technician forecasting (2018-2030)

Years	optimum pharmacist	total hospital clinical pharmacy Technician (Hospital Pharmacist-Clinical pharmacy technicians 1:1)	total hospital Male clinical pharmacy Technical	total hospital female clinical pharmacy Technical	total PHCs clinical pharmacy Technician (PHCs Pharmacist-Clinical pharmacy technicians 1:1)	total hospital Male clinical pharmacy Technical	total hospital female clinical pharmacy Technical
2018	8,797.44	8,797.44	4,398.7	4,398.7	12,223.05	6,111.5	6,111.5
2019	9,020.90	9,020.90	4,510.5	4,510.5	12,533.52	6,266.8	6,266.8
2020	9,250.03	9,250.03	4,625.0	4,625.0	12,851.87	6,425.9	6,425.9
2021	9,484.98	9,484.98	4,742.5	4,742.5	13,178.30	6,589.2	6,589.2
2022	9,725.90	9,725.90	4,863.0	4,863.0	13,513.03	6,756.5	6,756.5
2023	9,972.93	9,972.93	4,986.5	4,986.5	13,856.26	6,928.1	6,928.1
2024	10,226.25	10,226.25	5,113.1	5,113.1	14,208.21	7,104.1	7,104.1
2025	10,485.99	10,485.99	5,243.0	5,243.0	14,569.10	7,284.6	7,284.6
2026	10,752.34	10,752.34	5,376.2	5,376.2	14,939.16	7,469.6	7,469.6
2027	11,025.45	11,025.45	5,512.7	5,512.7	15,318.61	7,659.3	7,659.3
2028	11,305.49	11,305.49	5,652.7	5,652.7	15,707.70	7,853.9	7,853.9
2029	11,592.65	11,592.65	5,796.3	5,796.3	16,106.68	8,053.3	8,053.3
2030	11,887.11	11,887.11	5,943.6	5,943.6	16,515.79	8,257.9	8,257.9
Average	10,271.34	10,271.34	5,135.68	5,135.68	14,270.87	7,135.44	7,135.44

yet. The findings of the study explored the number of pharmacy technician presented without any basis of demand or requirements. The author suggests the ratio of pharmacist to clinical pharmacy technician was (1:1) at hospitals and primary healthcare centers with an equal gender distribution of male and female 50% each of them. As results, during the past twelve years, the number of the clinical pharmacy technician would be the same pharmacist based on actual or optimum pharmacist works at a hospital or primary health care centers. Besides, the forecasting of clinical pharmacy technician at the hospital or primary health care centers was the same as the number of pharmacists taken from previous studies done by the authors.³²⁻³⁴ The findings showed almost 24,000 of clinical pharmacy technician forecasting at the year of 2030. Those can produce through an established college of a pharmacy technician with two years of the curriculum to graduate clinical pharmacy technician. The enrollment of student from secondary schools' certificates or bachelors of sciences of biology, chemistry or physics. Almost 60% of forecasting, clinical pharmacy technician will work in hospitals and 40% covers the primary health care services. However, with new update strategic pharmacy plan and implementation of Saudi managed care pharmacy, the clinical pharmacy technician should help the managed care clinical pharmacist in their job at community pharmacies and primary health care centers.³⁷ The clinical pharmacy technician should be reported annually through the yearly Minis-

try of health statistical book. Besides, this is the first study done in the kingdom of Saudi Arabia about clinical pharmacy Technician workforce and Gulf or Middle East countries. The study should be repeated with an actual number of clinical pharmacy technician at all types of the healthcare organization, either governmental or private sectors in the kingdom of Saudi Arabia.

CONCLUSION

The clinical pharmacy technician has an essential role with the clinical pharmacist in providing clinical care to the patients. The clinical pharmacy technician demand was determined with both equally genders. The ratio of pharmacist to clinical pharmacy technician was suggested to implement. The periodical analysis of clinical pharmacy technician is highly recommended at all governmental and private sectors in the kingdom of Saudi Arabia.

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CONFLICT OF INTEREST

The authors declare no conflict 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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