

Pharmacy Technician Workload and Workforce Requirements at MOH Hospitals during Ten years Mass Gathering Hajj (2006-2015) in Makah Region, Saudi Arabia

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Abstract

Purpose: To explore the Pharmacy technician services workload analysis and human resources requirements at Ministry of Health Hospitals during mass gathering Hajj ten years (2007-2016), Saudi Arabia. **Methods:** It is a retrospective of ten years (2007-2015) of hospital Pharmacy technician workload during mass gathering Hajj period. The duration of workload collection was 15 days. The Pharmacy technician prepares the medications and pharmaceutical to all patients either Pilgrim or not Pilgrim at Makah region. It included Mona holy places hospitals; Arafa holy places hospitals, and Makah city. The workforce requirements calculated based on MOH workforce standards per bed and the workload drives as central Pharmacy technician services, patient specific Pharmacy technician activities, and Pharmacy technician administration specific pharmacy activities. **Results:** The total number of Pilgrims (1,952,817-3,161,573) with average of (2,445,208). The total number of prescriptions (99,886-257,545) with average (180,120), it represented (5.11-12.07%) with average (7.86%) of all pilgrims. The average number of pharmacy technician calculated per hospital was (17.74 FTE), while the mean number pharmacy technician needed based on workload for all services was (110.95FTE) per hospital in all Makka region. It is (6.12 fold) more incremental than MOH pharmacy technician workforce standards per bed. **Conclusion:** Despite the clinical pharmacy technician's activities missed with emphasis on patient-specific clinical pharmacy technician and administrative pharmacy technician performances. There is a high demand for pharmacy technician workforce during mass gathering Hajj period in Makah Region, Saudi Arabia.

Keyword: Pharmacy technician, Workload, Workforces, Mass Gathering, Hajj, Makka, Ministry of Health, Saudi Arabia

INTRODUCTION

Every year there is a huge mass gathering event occurred in holy cities in the kingdom of Saudi Arabia. The famous holy cities are Makka and Al-Madina. The mass gathering is defined as the presence of more than 1000 people together at the same period.^[1] The mass gathering event called Hajj. It is the fifth pillar of Islam.



All Ministries in the Kingdom of Saudi Arabia provides the best services to Pilgrim including Ministry of Health. There was MOH strategic plan with multiple expansions of health care services over the years with best and high quality of medical services.^[2-3] The essential part of the services were human health care resources including physician pharmacist and nurses to work in all medical institutions. One of the core parts was pharmacy technician works at hospital and primary care centers. The last statistical report of Ministry of Health (MOH) mentioned that some pharmacy technician worked at MOH organization was more than eight thousand while the pharmacist was three thousand and five hundred.^[2] That is almost more than thrice of a pharmacy technician is than a pharmacist. With a high workforce of pharmacy technician what's was the role of pharmacy technician at MOH institution in Saudi Arabia. The seldom to find a published literature discussed pharmacy technician in Saudi Arabia and any related issues. Also, there are insufficient studies on GCC countries or Middle East countries. However, there are several publications from the USA, Canada and Australia clarified that.^[4-6] Those countries try to improve the pharmacy technician performance to advance activities with clinical support to the clinical pharmacist.^[7-8] The pharmacy technician support and help the pharmacist at their pharmacy practice and clinical pharmacist performance. The General Administration of Pharmaceutical Care (GAPC) setup the standards of pharmacy technician requirements for hospitals and primary care centers at regular normal days.^[9] However, there are no standards of pharmacy technician requirements during mass gathering events with an emphasis on Hajj time. The author is not familiar with any study in Saudi Arabia Middle East or even over the entire world about pharmacy technician workforce during mass gathering events including the Hajj. In this study, the authors explored the pharmacy technician workload and human resources during hajj in ten years period (2006-2015).

METHODS

It is a retrospective study of ten years (2006-2015) of pharmacy technician workload at hospitals during mass gathering Hajj period. The duration of workload collection was 15 days. The pharmacy technician prepares the medications and pharmaceuticals before dispensing to all patients either Pilgrim or not Pilgrim at Makah region. It included Mina holy places hospitals; Arafat holy places hospitals, and Makah city. All the data derived from Ministry of Health. Health Statistical Year Books.^[10-19] Also, there was extensive literature review search at open date periods with fifty databases included.

It included the type of studies (meta-analysis, randomized controlled studies, and observational studies, books, reports etc) in the English language. The search for the term of Hajj and workforce, Hajj and workforce, Hajj and human resources or mass gathering and workforce, mass gathering and workforce, mass gathering and human resources. The search term was in the title and key words. All setting of patient care services hospitals; inpatient or ambulatory care or community services included. The search included pharmacy technician workload. The location of studies included Saudi Arabia as top propriety if not existed Gulf or Middle East countries included, if not found overall counties included. The fifteen hospitals included in the study located in Makka city and Holy places. They all have Intensive Care Unit department, Emergency Room department, Surgery unit, Internal Medicine unit.^[20-27] The workforce requirements calculated based on MOH workforce standards per bed and the workload preparation of dispensing prescriptions. Moreover, from as central pharmacy technician services, patient specific pharmacy technician activities, and general administration specific pharmacy technician activities based on American college of clinical pharmacy society and other literature.^[4,5,27-30] The updated hospital's demographic information and the workload calculation based on pharmacy administration database in Makka region with considered that is an average time of pharmacy technician preparation for dispensing inpatient order was 3 minutes; while Ambulatory care and emergency 2 minutes. All calculation done used Microsoft Excel version ten.

RESULTS

There were fifteen hospitals in Makka city and holy places. The majority of them provided emergency and internal medicine services 15 (100%) followed by surgery services 13 (86.6%) and adults intensive care units 11(73.3%). Some hospitals got accreditations from local organization CBAHI 6 (40%) while only a few hospitals had accreditation from international institution Joint commission 2 (13 %). Most of the hospital outpatient pharmacy, inpatient pharmacy and emergency with pharmacy store followed by extemporaneous preparation unit, medication safety officer and pharmacy total quality management 15(100%) while missed clinical pharmacy services and medication reconciliation 0 (0%) as explored in table 1. The most pharmacy technician activities were Prepare the medications for dispensing Inpatient, OPD, Emergency Pharmacy, Distribution of floor stock medication, and Assistant for Extemporaneous preparation. Followed by assisting the pharmacist in the Pharmacy Total Quality and Pharmacy

Table 1: Type of pharmaceutical care services in Makkah region

	NR	0-50	51-100	101-200	201-300	301-400	401-500	501-600	> 600	Not existed	Total existed
Pharmacy services											
1 OPD Pharmacy	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
2 Inpatient Pharmacy	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
3 ER Pharmacy	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
4 Extemporaneous preparation	0	1	0	3	2	0	2	1	0	6 (40%)	9 (60%)
5 Intravenous Admixture	0	0	0	0	1	0	2	0	0	12(80%)	3 (20%)
6 TPN services	0	0	0	0	1	0	2	0	0	12(80%)	3 (20%)
7 Satellite Pharmacy	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
8 Pharmacy store	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
9 Medication Safety officer	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
10 Pharmacy Total Quality management	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
11 Drug Information Center	0	1	1	6	3	0	2	0	0	1(6.6%)	14(93.3%)
12 Clinical Pharmacy Services	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
13 Patient Counseling	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
14 Medication Reconciliation	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
15 Computerized Physician Order Entry (CPOE)	0	0	0	1	2	0	1	1	0	10 (66.7%)	5 (33.3%)
16 Provide the pharmacy services over 24 hour	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)

store and Documentation of Medication Safety officer reports 15 (100%). While missed Documentation of Clinical Pharmacy Services Documentation of Patient Counseling and Assistant the pharmacist in the Medication Reconciliation 0 (0%) as explored in table 2. The total number of Pilgrims over the ten years was (1,952,817 - 3,161,573) with an average of (2,445,208). The total number of the bed was (2,350 - 3,609) with a mean (2,868.60). The total number of prescriptions (99,886 - 287,138) with average (190,822), this percentage represented (5.111 - 12.08 %) with average (7.86%) of all pilgrims. From these prescriptions, an average of (101,328.80) prescriptions in Makah, which represented (4.14 %) of all pilgrims, and an average of (89,493.40) prescriptions were in holy places, which represented (3.72 %) of all pilgrims. The average number of Ambulatory care prescriptions was (69,517) while (22,959) was the average of emergency prescription, and (2,935) for inpatient prescriptions. The average number of Ambulatory prescriptions per day (4,517) contained (13,551) medications, the emergency orders were (1,492) per day contained (4,476) drugs, and Inpatient prescriptions were (185) per day included (555) medications as explored in table 3-4. In Makka city, the inpatient services, the average number of pharmacy technician needed was 2.93 FTE (full-time employee) per hospital, while for Emergency service 16.18 FTE per hospital, and 35.46 FTE per hospital for Ambulatory care with the total average 54.56 FTE per hospital. In the holy places, the inpatient services, the average number of pharmacy technician needed was 1.82 FTE (full-time employee) per hospital, while for Emergency service 8.21 FTE per hospital, and 41.25 FTE per hospital for Ambulatory care with the total average 51.28 FTE per hospital as explored in table 3-4. The average number of pharmacy technician calculated per hospital was (17.74 FTE), while the mean number pharmacy technician needed based on workload for all services was (110.95 FTE) per hospital in all Makka region. It is (6.12 fold) more incremental than MOH pharmacy technician workforce standards per bed with the new suggestion of workforces as the number of pharmacy technician per bed during mass gathering Hajj period was 0.28 as explored in table 5. There were not any central pharmacy technician activities, clinical pharmacy technician services or administrative pharmacy technician activities.

DISCUSSION

The general administration of Pharmaceutical Care released the pharmacy strategic plan in 2013 for all pharmacist and pharmacy technician.^[31] The pharmacy strategic plan based on MOH strategic plan for medical services.^[31] The consisted

Table 2: Type of hospital pharmacy technician, s performances in Makkah region

		NR	0-50	51-100	101-200	201-300	301-400	401-500	501-600	> 600	Not existed	Total existed
	Hospital Pharmacy technician activities											
1	Prepare the medications for dispensing Inpatient, OPD, Emergency Pharmacy	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
2	Fill the medication in the unit dose system	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
3	Repacking system for unit dose system	0	0	0	0	0	2	0	1	0	3 (20%)	12(80%)
4	Filling the automated dispensing cabinet	0	0	0	0	0	1	0	1	0	13 (86.6%)	2 (13.3%)
5	Distribution of floor stock medication	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
6	Assistant for Extemporaneous preparation	0	1	0	3	2	0	2	1	0	6 (40%)	9 (60%)
7	Prepare Intravenous Admixture manually	0	0	0	0	1	0	2	0	0	12(80%)	3 (20%)
8	Arrange the premixed ready-made medication	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
9	Prepare for Robotic intravenous Admixture	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
10	Monitoring of Smart infusion pump	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
11	Prepare TPN solution	0	0	0	0	1	0	2	0	0	12(80%)	3 (20%)
12	Prepare the intravenous Chemotherapy therapy preparation	0	0	0	0	0	0	1	0	0	14 (93.3%)	1 (6.7%)
13	Check intravenous medication compatibilities	0	0	0	0	1	0	2	0	0	12(80%)	3 (20%)
14	Follow up the barcoding Administration medication	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
15	Management of medication and Pharmacy store	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
16	Documentation of Medication Safety officer reports	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
17	Assist the pharmacist in the Pharmacy Total Quality management	0	2	1	6	4	0	2	0	0	0 (0%)	15(100%)
18	Documentation of Clinical Pharmacy Services	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
19	Documentation of Patient Counseling	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
20	Assistant the pharmacist in the Medication Reconciliation	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
21	Assistant the pharmacist in the transition care system	0	0	0	0	0	0	0	0	0	15(100%)	0 (0%)
22	Monitoring the medication Computerized Physician Order Entry (CPOE)	0	0	0	1	2	0	1	0	0	11(73.3%)	26.7 (20%)

Table 3: Number of calculated Full-Time Employee Pharmacy Technician based on workload of Inpatient, Emergency (ER), and Ambulatory care services prescriptions at Makka city over ten years in Makka city

Makah city									
Y (H)	Y (G)	Pilgrims number	No of Inpatient Prescriptions	FTE/Hospital	No of ER Prescriptions	FTE/Hospital	No of Ambulatory care Prescriptions	FTE/Hospital	Total FTE/Hospital
1427	2006	2,378,636	4,528	3.54	41,083	21.40	133,862	69.72	94.66
1428	2007	2,454,325	4,800	3.75	40,343	21.01	125,224	65.22	89.99
1429	2008	2,408,849	4,830	4.32	43,147	25.69	113,042	67.29	97.28
1430	2009	2,313,278	4,402	3.06	35,124	16.26	44,918	20.80	40.12
1431	2010	2,789,399	4,588	3.19	39,092	18.10	54,108	25.05	46.34
1432	2011	2,927,717	4,610	4.12	35,016	20.85	49,547	29.49	54.45
1433	2012	3,161,573	3,789	2.96	33,645	17.53	45,891	23.90	44.39
1434	2013	1,980,249	1,368	1.07	16,624	8.66	42,151	21.96	31.68
1435	2014	2,085,238	1,301	1.02	9,317	4.86	36,461	18.99	24.86
1436	2015	1,952,817	2,908	2.27	14,233	7.42	23,336	12.16	21.84
Average		2,445,208.10	3,712.40	2.93	30,762.40	16.18	66,854.00	35.46	54.56

Table 4: Number of calculated Full-Time Employee Pharmacy Technician based on workload of Inpatient, Emergency (ER), and Ambulatory care services prescriptions at Holy places over ten years in Holy places

Holy places									
Y (H)	Y (G)	Pilgrims number	No of Inpatient Prescriptions	FTE/Hospital	No of ER Prescriptions	FTE/Hospital	No of Ambulatory care Prescriptions	FTE/Hospital	Total FTE/Hospital
1427	2006	2,378,636	1,770	1.58	7,942	4.73	97,953	58.31	64.62
1428	2007	2,454,325	1,740	1.56	6,676	3.98	78,762	46.88	52.41
1429	2008	2,408,849	1,754	1.57	7,416	4.42	73,458	43.73	49.71
1430	2009	2,313,278	1,561	1.40	5,860	3.49	72,172	42.96	47.84
1431	2010	2,789,399	2,629	2.35	7,836	4.67	82,810	49.29	56.31
1432	2011	2,927,717	2,154	1.93	6,893	4.11	86,805	51.67	57.70
1433	2012	3,161,573	2,805	2.19	79,888	41.61	9,256	4.82	48.62
1434	2013	1,980,249	1,722	1.35	8,556	4.46	81,536	42.47	48.27
1435	2014	2,085,238	2,141	1.68	11,341	5.91	92,089	47.97	55.54
1436	2015	1,952,817	3,297	2.58	9,153	4.77	46,959	24.46	31.80
Average		2,445,208.10	2,157.30	1.82	15,156.10	8.21	72,180.00	41.25	51.28

Year	Makah City				Holy Places				Total Makka Region						
	No of Hospitals	No of beds	No of Pharmacy technician MOH Standards	No of Pharmacy technician Workload	No of Hospitals	No of beds	No of Pharmacy technician MOH Standards	No of Pharmacy technician Workload	Total no of Beds	Total No of Pharmacy technician MOH Standards	Total No of Pharmacy technician Workload	No of Pharmacy technician per hospital (MOH Standards)	No of Pharmacy technician (Workload)	No of fold times	New guidelines of No of Pharmacy technician MOH Standards per bed during mass gathering Hajj
2006	8	1,528	70.29	757.24	7	822	37.81	452.31	2,350	108.10	1,209.55	15.44	172.79	11.19	0.51
2007	8	1,574	72.40	719.88	7	1,005	46.23	366.87	2,579	118.63	1,086.75	16.95	155.25	9.16	0.42
2008	7	1,537	70.70	680.96	7	1,076	49.50	347.94	2,613	120.20	1,028.90	17.17	146.99	8.56	0.39
2009	9	1,485	68.31	361.04	7	1,060	48.76	334.88	2,545	117.07	695.92	16.72	99.42	5.94	0.27
2010	9	1,457	67.02	417.02	7	1,080	49.68	394.14	2,537	116.70	811.15	16.67	115.88	6.95	0.32
2011	7	1,457	67.02	381.15	7	1,080	49.68	403.87	2,537	116.70	785.02	16.67	112.15	6.73	0.31
2012	8	2,068	95.13	355.08	8	1,447	66.56	388.96	3,515	161.69	744.04	20.21	93.01	4.60	0.21
2013	8	2,068	95.13	253.44	8	1,447	66.56	386.16	3,515	161.69	639.60	20.21	79.95	3.96	0.18
2014	8	1,570	72.22	198.88	8	1,316	60.54	444.32	2,886	132.76	643.20	16.60	80.40	4.84	0.22
2015	8	2,507	115.32	174.72	8	1,102	50.69	254.40	3,609	166.01	429.12	20.75	53.64	2.58	0.12
Average	8.00	1,725.10	79.35	429.94	7.40	1,143.50	52.60	377.39	2,868.60	131.96	807.33	17.74	110.95	6.12	0.28

of five general strategic goals with initiatives and more than eighty projects. The pharmacy administration formulated several task forces committees to for project management and implementation. The pharmacy technician participated in several committees including public education committee, an electronic pharmacy automation committee. The public educational committee was one of the best and very active committees. The members participate in medication public education lectures, participated in writing on social media and organize them, published medication material at different languages for distribution during mass Gathering hajj period. The pharmacy administration implemented the ASHP guidelines of a pharmacy technician in pharmacy practice.^[4] The pharmacy technician prepares the medication for distribution through the pharmacist at all project of pharmacy practice. Also, the pharmacy technician participated at several short educational courses including Intravenous admixture, total parental nutrition. Also, it was starting point for pharmacy technicians advance performances in the clinical activities. Some pharmacy technician participated as co-authors with the publication of patient satisfaction of pharmacy services of primary care centers.^[32] All fundamental role of pharmacy technician implemented during mass gathering hajj time at hospitals and primary care centers when they started mass gathering medicine and mass gathering pharmaceutical care. The program consisted of mass gathering pharmacy practice, mass gathering clinical pharmacy, and mass gathering pharmacy workforces that have included the pharmacy technician.^[33-34] The author tried to investigate the pharmacy technician workforces during mass gathering important event called the Hajj over past ten years. The authors found very high demand based on workload calculation with pharmacy technician as compared to MOH standards. After very extensive literature review an only small number of studies discussed utilized physician and nurses during mass gathering events but not pharmacy technician.^[35-37] The authors cannot compare with other studies because this is the first study existed in the world for pharmacy technician workforces and workload calculation and requirements during mass gathering Hajj event. The author suggested the new guidelines with 0.28 pharmacy technician per bed during mass gathering Hajj period. Also, another suggestion to solve the demand of the pharmacy technician by implementation the new system called Saudi managed care pharmacy the new initiative project recently published.^[38-39] The author did not calculate the workforce of pharmacist or clinical pharmacist it a further study in the future.

Limitation: There are several limitations with the study and it some time out of authors control. It included as follows;

there is insufficient official data about pharmacy technician during mass gathering Hajj time over entire the study, it seems the first investigations in the world, there is no official documentation of pharmacy technician workload analysis during mass gathering Hajj time.

CONCLUSION

There is a high demand for pharmacy technicians during mass gathering Hajj time over past several years. The MOH standards of pharmacy technician should update during mass gathering event. All pharmacy activities including pharmacy technician performances should document during Hajj period to refresh the calculation based on workload analysis during mass gathering Hajj period in the future studies in Makka region, Saudi Arabia

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CONFLICT OF INTEREST

None

ABBREVIATION USED

KSA: Kingdom of Saudi Arabia, MOH: Ministry of Health, USA: United States of America, ACCP: American Collge of Clinical Pharmacy

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Abstract Objective: To explore the clinical pharmacy technician services and workforce requirements at Ministry of Health primary health care centers during mass gathering Hajj ten years (2006-2015) at Makah and Al-Medina Regions in Saudi Arabia. Methods: It is a retrospective analysis of ten years (2006-2015) of MOH primary health care centers (PCC) pharmacies during mass gathering Hajj period (15-30 days). The clinical pharmacy technician helps the clinical pharmacist to provide pharmaceutical to all patients either Pilgrim or not Pilgrim at Makah region. It included Mona holy places hospita... Determining Hospital Workforce Requirements: A Case Study. Serpil Ozcan¹, Peter Hornby² (1) World Bank Health Project, Ministry of Health, Ankara, Turkey and Centre for.Â b. create a framework for determining workload based staffing requirements for all MOH general and teaching hospitals with the process repeated for the university hospitals to provide consistency in staffing standards for major hospital types; andÂ As described earlier, the focus for the study was on three types of hospitals (general hospitals, teaching hospitals and university hospitals) and ten different staff categories. University hospitals are not under the direct control of MOH.Â Specialist Dentist Nurse Lab Technician X-ray Technician. 1,704 1,688 1,592 1,672. 925.