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RESEARCH ARTICLE

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Pharmacy Technician Workload and Human Resources Requirements at MOH Hospitals during Nine years Mass Gathering Hajj (2006-2014) in Al-Medina Region, Saudi Arabia

Yousef Ahmed Alomi*[1], Khairat Alhennawi[2], Nizar Khayayt[3]

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

[2]*Clinical pharmacy staff, General Administration of Pharmaceutical Care, Ministry of Health, Riyadh, KSA.*

[3]*Medication Safety Officer General Administration of Pharmaceutical care, Makkah Region, Ministry of Health, Riyadh, KSA.*

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***Correspondence to:**

Dr. Yousef Ahmed Alomi,

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

Abstract

Objective: To explore the pharmacy technician workload analysis and workforce requirements at Ministry of Health Hospitals during mass gathering Hajj nine years (2006-2014) in Al-Medina Region, Saudi Arabia. **Methods:** It is a retrospective of nine years (2006-2014) of hospital pharmacy technician workload during mass gathering Hajj period. The duration of workload collection was 15-30 days each year. The pharmacists provide pharmaceutical to all patients either Pilgrim or not Pilgrim at Medina region. 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 general administration specific pharmacy technician activities. **Results:** The total number of Pilgrims (1,952,817-3,161,573) with average (2,445,208). The total number of prescriptions was (22,278-133,107) with an average of (78,955). It represented (1.07-5.02%) with an average (3.11%) of all pilgrims. The total average number of pharmacy technician needed in Al-Madina was (69.2 FTE) per hospital. It divvied into (3.21FTE) for inpatient services per hospital, (11.48 FTE) for Emergency services per hospital, and (54.51FTE) for Ambulatory care services per hospital. The average number of pharmacy technician calculated per hospital was (38.47 FTE), while the mean number pharmacy technician needed to base on workload for all services was (69.20 FTE) per hospital. **Conclusion:** The pharmacy technician workforce's analysis showed high demand during mass gathering Hajj over past several years despite clinical pharmacy technician missed. Aiming to increase workforce of pharmacy technician is potential to improve pharmacy services during mass gathering Hajj period in Al-Madina, Saudi Arabia.

Keyword: Pharmacy Technician, Workload, Workforces, Mass Gathering, Hajj, Al-Medina, Ministry of Health, Saudi Arabia

INTRODUCTION

Al-Madina Almunawara is one of the holy cities in Islam. Some pilgrims visited either before went to Makka or after finished the Hajj performance. The mass gathering is the attendance or participation of a vast number of people (usually more than 1000 people) in an event.[1] The hajj conferee considered the biggest mass gathering event

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in the world. The Ministry of Health in the Kingdom of Saudi Arabia expanded the medical services over the years with some hospitals or primary care centers.[2] The expansion needs several things including health care Human Resources. The physicians, pharmacists, and nurses included with additional to assistant medical professionals for instance assistant nurses, assistant radiology, and assistant pharmacists or pharmacy technicians. Also, the huge numbers of mass gathering hajj demand very high numbers of medical professionals. Several studies done about health related issues during Hajj; included the patterns of diseases, the effect of pre-vaccination, the patient satisfaction of ambulatory care.[3-7] It is hard to find locally or Gulf area or Middle East countries and overall the world investigations of workforces during mass gathering events. The pharmacy technician help and support the pharmacist and clinical pharmacist with all pharmacy related performances. The pharmacy technician's description job well known in USA, Canada, and Austria with several publications while missed in Saudi Arabia or Gulf or Middle East countries.[8-10] The pharmacy technician discipline not adequately discussed in the literature, as the term mass gathering pharmaceutical care established recently in 2016 by Alomi et al.[11] Moreover, the authors not familiar with any investigation either locally or in the world about pharmacy technician's workforce during mass gathering events with an emphasis on Hajj period. In this study, the authors have measured the pharmacy technician workload and human resources requirements at MOH hospitals during nine years mass gathering Hajj (2006-2014) in Al-Medina Region.

METHODS

It is a retrospective of nine years (2006-2014) of pharmacy technician workload at hospitals during mass gathering Hajj period. The duration of workload collection was 15-30 days. The pharmacists prepare the medications and pharmaceuticals for dispensing to all patients either Pilgrim or not Pilgrim at Al-Madina region. All the data derived from Ministry of Health. Health Statistical Year Books.[12-20] 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. 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 twenty hospitals included in the study located in *Al*-Medina.[21-24] The workforce requirements calculated based on MOH workforce standards per bed and the workload derived from as central pharmacy technician services, patient-specific pharmacy technician activities. Moreover, general administration specific pharmacy technician activities based on American college of clinical pharmacy society and other literature.[8-10,25-27] The updated hospital's demographic information and the workload calculation based on MOH and pharmacy administration database in Al-Madina region with considered that is an average time of pharmacy technician preparation for dispensing inpatient order was three minutes; while Ambulatory care and emergency two minutes. All calculation done used Microsoft Excel version ten.

RESULTS

There were twenty hospitals in Al-Madina region while nine hospitals only mentioned in MOH statistical book. The majority of them provided Adults intensive care units 20 (100%), Neonatal intensive care units 20 (100%), Emergency services 20 (100%) Ambulatory care services 20 (100%). It followed by Surgery services 20 (100%), Maternity, Obstetrics, and Gynecology 20 (100%), and General Pediatrics 20 (100%). Few hospitals got accreditations from local organization CBAHI 6(30%), while only small hospitals had accreditation from international institution Joint commission 3 (15%). Most of the hospital had an outpatient pharmacy, inpatient pharmacy and emergency followed by medication safety officer and total pharmacy quality management 20(100%) while missed patient counseling and medication reconciliation 0 (0%). 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 20 (100%). Followed by Management of medicines, Pharmacy store and Documentation of Medication Safety officer reports, and assist the pharmacist in the Pharmacy Total Quality 20 (100%). While missed Documentation of Clinical Pharmacy Services Documentation of Patient Counseling and Assistant the pharmacist in the Medication Reconciliation 0 (0%). The total number of Pilgrims was (1,980,249-3,161,573) with average of (2,499,918.22). The average number of pilgrims per hospital was (483,882.470) and 3,087.18 pilgrims per bed over nine years. The total number of prescriptions was (22,278-133,107) with an average of (78,955). It represented

Table 1: Type of hospital pharmacy technicians performances in Al-Madina 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	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
2	Fill the medication in the unit dose system	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
3	Repacking system for unit dose system	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
4	Filling the automated dispensing cabinet	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
5	Distribution of floor stock medication	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
6	Assistant for Extemporaneous preparation	0	0	0	2	0	0	1	1	0	16 (0%)	4 (100%)
7	Prepare Intravenous Admixture manually	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
8	Arrange the premixed ready-made medication	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
9	Prepare for Robotic intravenous Admixture	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
10	Monitoring of Smart infusion pump	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
11	Prepare TPN solution	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
12	Prepare the intravenous Chemotherapy therapy preparation	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
13	Check Intravenous medication compatibilities	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
14	Follow up the barcoding Administration medication	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
15	Management of medication and Pharmacy store	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
16	Documentation of Medication Safety officer reports	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
17	Assist the pharmacist in the Pharmacy Total Quality management	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
18	Documentation of Clinical Pharmacy Services	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
19	Documentation of Patient Counseling	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
20	Assistant the pharmacist in the Medication Reconciliation	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
21	Assistant the pharmacist in the transition care system	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
22	Monitoring the medication Computerized Physician Order Entry (CPOE)	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)

(1.07 - 5.02%) of all pilgrims with average (3.11%). For the Ambulatory care, the average number of prescriptions was (62,938), while (13,674) was for an emergency prescription, and (2,343) inpatient prescriptions. The mean number of ambulatory prescription per day (2,349) contained (7.047) medications, the emergency orders were (623) per day provided (1,869) drugs, and Inpatient prescription was (108) per day included (324) medications as explored in table 1. The total average number of pharmacy technician needed in Al-Madina was (69.2 FTE) per hospital. It divvied into (3.21FTE) for inpatient services per hospital, (11.48 FTE) for Emergency services per hospital, and (54.51FTE) for Ambulatory care services per hospital as explored in table 2. The average number of pharmacy technician calculated per hospital was (38.47 FTE), while the mean number pharmacy technician needed to base on workload for all services was (69.20 FTE) per hospital. It considered (1.8 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 0.42 as explored in table 3. There were not any central pharmacy technician activities, clinical pharmacy technician services or administrative pharmacy technician activities.

DISCUSSION

The Ministry of Health started the health care strategic plan in 2010 with several achievements.[28] The pharmacy strategic plan among them to cover more than 250 hospitals and 2000 primary care centers and all regions in the kingdom of Saudi Arabia with emphasis on Makka and Al-Madina regions.[29] The pharmacy administration at MOH involved pharmacy technicians as membership into several central or peripheral committee including pharmacy total quality management, the computerized and pharmacy automation, and pharmacy public education committee. The pharmacy administration conducted several education courses including medication safety, pharmacy total quality management, and Intravenous admixture and Total parental nutrition with participated of pharmacy technicians from all regions including Al-Madina region. Also, there were special courses during mass gathering hajj event either traditional or electronic courses. The pharmacy administration started a unique pharmacy technicians training program with new staff for six months with the collaboration of medical education and trading administration. The program formulated by international universities from United Kingdom (UK) and Canada and pharmacy administration with the educational department at MOH. The program consisted of an essential

Table 2: Number of calculated Full-Time Employee (FTE) Pharmacy Technician based on workload at Inpatient, Emergency (ER), and Ambulatory care services prescriptions over nine years in Al-Medina region

			Al-Medina						
Y (H)	Y (G)	Pilgrims number	No of Inpatient Prescriptions	FTE/Hospital	No of Emergency Prescriptions	FTE/Hospital	No of Ambulatory care Prescriptions	FTE/Hospital	Total FTE/ Hospital
1427	2006	2,378,636	4,572	7.15	42,982	44.78	31,812	33.14	85.06
1428	2007	2,454,325	3,553	5.55	2,283	2.38	36,014	37.52	45.45
1429	2008	2,408,849	2,984	4.67	7,114	7.41	110,814	115.43	127.51
1430	2009	2,313,278	2,782	3.48	9,492	7.91	95,173	79.31	90.70
1431	2010	2,789,399	2,457	3.84	11,023	11.48	119,627	124.61	139.94
1432	2011	2,927,717	2756	2.46	14,292	8.51	110,600	65.84	76.80
1433	2012	3,161,573	1,151	1.03	26,190	15.59	19,812	11.80	28.41
1434	2013	1,980,249	412	0.37	6,038	3.60	24,384	14.52	18.48
1435	2014	2,085,238	424	0.30	3,648	1.69	18,206	8.43	10.41
Average		2,499,918.22	2,343.44	3.21	13,673.56	11.48	62,938.00	54.51	69.20

Table 3: Comparison of number of calculated Full-Time Employee Pharmacy Technician based on workload and MOH standards over nine years in Al-Medina region

Year	Al-Medina					
	No of Hospitals	No of beds	No of pharmacy technician 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	4	723	33.26	85.06	2.56	0.47
2007	4	687	31.60	45.45	1.44	0.26
2008	4	755	34.73	127.51	3.67	0.68
2009	5	863	39.70	90.70	2.28	0.53
2010	4	811	37.31	139.94	3.75	0.69
2011	7	811	37.31	76.80	2.06	0.66
2012	7	811	37.31	28.41	0.76	0.25
2013	7	811	37.31	18.48	0.50	0.16
2014	9	1,255	57.73	10.41	0.18	0.07
Average	5.67	836.33	38.47	69.20	1.80	0.42

aspect of pharmacy practice with goals and infective for each unit, competency measuring and evaluating tools. All documented system was electronic through the website of MOH. That covered all regions in the kingdom including Makka and Al-Madina regions. The authors try to investigate the demand for pharmacy technician's workforce during mass gathering hajj time with outcomes results reflect of pharmacy technician's performance with high percentages of preparation medication for also dispensing medication safety and quality management reporting. The other pharmacy technicians performances were weak. That is because implementation plan not completed conducted. The results finding with the very high demand for pharmacy technicians several times fold incremental during mass gathering hajj period as compared with regular days. The author suggested updating MOH standards of a pharmacy technician to be 0.42 per bed during mass gathering hajj period. After very extensive literature review an only small number of studies discussed utilized physician and nurses during mass gathering events but not pharmacy technician.[30-32] The authors could not compare the results other studies. It seems the study was the first investigation conducted in the world. The study excluded the pharmacist and clinical pharmacist for further investigation shortly.

Limitation: Despite the study was the first overall the world there are certain restrictions included; the MOH statistical books not mentioned all pharmacy services included pharmacy technician workload during mass gathering Hajj period, a complete demographic data about hospital missed the in MOH database, and the pharmacy technician publication in Saudi Arabia missed.

Conclusion: The pharmacy technician workload reflected the demanding during mass gathering Hajj period in Al-Medina region, Saudi Arabia despite the missing of nonclinical and clinical pharmacy technician performances. Targeting of complete documentation of pharmacy technician related issues assist to refresh real calculation of pharmacy technician workforces calculation during mass gathering Hajj period in the future's studies in Al-Medina region, Saudi Arabia.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

KSA: Kingdom of Saudi Arabia, MOH: Ministry of Health, UK: United Kingdom

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