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RESEARCH ARTICLE

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

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Abstract

Purpose: To explore the pharmaceutical care workload analysis and workforce requirements at Ministry of Health Hospitals during mass gathering Hajj nine years (2006-2014) in Al-Madina Region, Saudi Arabia. Methods: It is a retrospective of nine years (2006-2014) of hospital pharmacies 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 Madina region. The workforce requirements calculated based on MOH workforce standards per bed and the workload drives as central pharmacy services, patient specific pharmacy activities, and general administration specific pharmacy 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 average number of pharmacist needed (6.41 FTE) for inpatient services per hospital, (22.96 FTE) for Emergency services per hospital, and (109.02 FTE) for Ambulatory care services per hospital. The average number of pharmacist calculated per hospital was (29.5 FTE), while the mean number pharmacist needed to base on workload for all services was (24.4 FTE) per hospital. There were not any central pharmacy activities, and clinical pharmacy services or administrative pharmacy activities. Conclusion: The pharmacy workload analysis reflects the real demand of pharmacist. Despite clinical pharmacy, activities missed with emphasis on inpatient clinical pharmacy programs; there is acceptable of number of pharmacists compared to MOH standards during mass gathering Hajj period in Al-Madina Region in Saudi Arabia.

Key word: Pharmaceutical Care, Workload, Workforces, Mass Gathering, Hajj, Al-Madina, Ministry Of Health, Saudi Arabia.

INTRODUCTION

The mass gathering is the attendance or participation of a vast number of people (usually more than 1000 people) in an event.[1] They could be religious, social gathering, or sport like the Olympic Games. One of the most significant mass gathering events is Hajj (the Islamic pilgrimage), in which more than 2 million Muslims come to Makah from all

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over the world every year. Many people also visit Al-Madina during this period, although this is not one of hajj rituals. This huge gathering needs special planning and preparing to ensure that this period passes safely with no major hazards. One of the sectors that affected majorly is the health care system; this is because of the associated medical risk with this vast number of people. Ministry of Health (MOH) in Saudi Arabia does their best in providing the best and free health care services to all pilgrims from the time they enter Saudi Arabia until their departure. That is because in the hajj, as with other mass gatherings, several people become sick and require medical care. In 2012, about 814,701 patients visited health care centers and hospital. Although most of them were outpatient, a large number of them have hospitalized 7,745 patients.[2] The diseases pilgrims suffer from are communicable diseases, but also due to traveling and exhaustions, heat, not eating proper food or uncontrolled chronic diseases that become worse with hajj condition.[3-6] Therefore, MOH pays attention to these people and puts specific standards for all mass gathering Hajj services including Human resources of health care providers to ensure the patients receive prevention of diseases and the best comprehensive medical care. Several studies have been done to study health related issues during Hajj; they have studied the patterns of diseases, the effect of pre-vaccination, the patient satisfaction of ambulatory care.[3-5-7-8] However, pharmaceutical care discipline not adequately discussed in the literature, as the term mass gathering pharmaceutical care established recently in 2016 by Alomi *et al*.[9] Also, there are insufficient studies were about health care professional workforces during mass gathering Hajj. After very extensive literature review an only small number of studies discussed utilized physician and nurses during mass gathering events but not pharmacists.[10-12] The author not familiar with published studies discussed pharmacy workforces during mass gathering meeting or even during Hajj period in Saudi Arabia or Gulf countries and the Middle East countries worldwide counties. In this study, the authors have measured the Pharmaceutical care workload and human resources requirements at MOH hospitals during nine years mass gathering Hajj (2006-2014) in Al-Madina Region.

METHODS

It is a retrospective of nine years (2006-2014) of hospital pharmacies workload during mass gathering Hajj period. The duration of workload collection was 15-30 days. The pharmacists provide pharmaceuticals to all patients either Pilgrim or not Pilgrim at Al-Madina region. All the data derived from Ministry of Health. Health Statistical Year Books[13-20] Also, there was extensive literature review search at open date periods with fifty databases included the following; Willy online library, a web of science, Springer link, Taylor and Francis, social science journal via ProQuest. The Science journal via ProQuest, Scopus, SciFinder, Science Direct, Sage Journal, Royal Society of Medicine, Royal Society of Chemistry, Psychology Journals via ProQuest. Pharmaceutical news index via ProQuest, patient education via MD consult, Drug via MD consult, Oxford Journals via Oxford University, Ovid Journals, Nursing and Allied Health Sources via ProQuest, Nature Publisher group, Medline index via ProQuest, Medline complete via EBSCO, Medical Evidence Matter via ProQuest, IGI InfoSci Journals. The Health Management via ProQuest, Health, and Medical Complete via ProQuest. Global Health Database-CABI, Family Health via ProQuest, Eric via ProQuest and EBSCO, Emerald, Dynamed via EBSCO, Directory of Open Access Journal (DOAJ), Current Content via Web of Knowledge, Dentistry, and Oral Science via EBSCO. The Clinical Key -Nursing, Clinical Key- Physician, CINAHL via EBSCO, Central via ProQuest, CBCA via ProQuest, Canadian Science Publishing. Cambridge Journals via Cambridge University, Britannica Academic, BMJ Journals, BMJ Clinical Evidence via BMJ Best Practice, BMJ Best Practice, Biology Journals via ProQuest, ACM Digital Library, Academic Search Ultimate via EBSCO, Cochrane Library Pubmed, and Google Scholar. 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 pharmacist and clinical pharmacist. Pharmacy technician excluded from the study. 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 hospitals included in the study located in *Al*-Madina about nine hospitals in, they are King Fahd Hospital; which is the main hospital in Al-Madina; it receives a referral from all other hospitals in the area. Saudi Commission accredits the program of training clinical pharmacist for Health Specialties, Maternity and Children Hospital (400 beds), Ohud Hospital; which is one of the largest hospitals in Al-Madina, with 261 beds capacity. It is considered the hospital in choice for referrals in ophthalmology and otolaryngology, Al-Ansaar general Hospital; which achieves

the highest number of receiving emergency cases in Saudi Arabia in 1432 H and 1433, Miqat General Hospital; It offers 65 beds for inpatients.[21-24]

The workforce requirements calculated based on MOH workforce standards per bed and the workload derived from as central pharmacy services, patient-specific pharmacy activities, and general administration specific pharmacy activities based on American college of clinical pharmacy society literatures.[25-27] The updated hospital's demographic information and the workload calculation based on MOH and pharmacy administration database in Almadina region with considered that is an average time of pharmacist dispensing inpatient order was 6 min, while Ambulatory care and emergency 4 min. The pharmacy technician workforce excluded in the calculations. 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%) as explored in Table 1**.** 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 as explored in Table 2. The total number of prescriptions was (22,278-133,107) with an average of (78,955). It represented (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 3. The average number of pharmacist needed (6.41 FTE) for inpatient services per hospital, (22.96 FTE) for Emergency services per hospital, and (109.02 FTE) for Ambulatory care services per hospital as explored in Table 4. The average number of pharmacist calculated per hospital was (29.5 FTE), while the mean number pharmacist needed to base on workload for all services was (24.4 FTE) per hospital. It considered (0.88 fold) more reduction than MOH pharmacist workforce standards per bed as explored in Table 5. There were no any central pharmacy activities, clinical pharmacy services or administrative pharmacy activities.

DISCUSSION

The ministry of health in the kingdom of Saudi Arabia published every year the statistical book of their performances. The first issue published in 2006.[13] The book consisted of several chapters included human resources if healthcare professional at different sectors, hospital performance, Ambulatory care and cemetery care services. In addition to the special chapter about mass Gathering hajj. The chapter contained hospital numbers and primary care centers number of pilgrims, the number of vaccines, and mortality rate during mass hajj period. It seldom to find like this report published annually about mass gathering events.[20] The reported discussed Makkah city holy places and Al-Madina region. The first report contained a performance of Al-Madina published in 2006 and missed in 2015.[13-28] However, the report missed the number and the type of workforces of healthcare providers including a pharmacist, type or number of medication dispensed or workload analysis of all performance during mass Gathering hajj period. In 2010, the MOH released health care strategic plan including Hajj healthcare plan.[29] The number of medical services expanded in Al-Madina over past several years. The number of hospitals and primary health centers increased from year to another while the number of pilgrims increased.[20-28] The authors did the study to calculate the demand of hospital pharmacist in Al-Madina region. The new standard of pharmacist per each bed implemented in 2014 including Al-Madina region hospitals.[30] The requirements of pharmacist for mass gathering events missed nationally or internationally. The author found the results of calculated full-time employment needed almost the same, as MOH standards due to the calculation not included all performance it only through dispensed prescriptions through different healthcare services. If all pharmacists activities calculated may be the staff required increase accordingly. Also, the number of pilgrims in Al-Madina relatively low compared with Makkah city. Visiting Al-Madina city is not an essential part of Hajj performances some of them not visited, and some

Table 1: Type of hospital services and pharmaceutical care services in Al-Madina region

No.		NR	0-50	51-100	101-200	201-300	301-400	401-500	501-600	> 600	Not existed	Total existed
	Hospital services											
1	Adults intensive care units		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
2	Neonatal intensive-care units		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
3	Emergency services		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
4	Ambulatory care services		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
5	Internal medicine		0	2	4	2	0	1	1	0	2 (10%)	18 (90%)
6	Surgery services		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
7	Maternity, Obstetrics, and Gynecology		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
8	General Pediatrics		10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
9	CIBAHI	0	0	1	0	3	0	1	1	0	14 (70%)	6(30%)
10	JCI	0	0	0	0	1	0	1	1	0	17 (85%)	3 (15%)
	Pharmacy services											
1	OPD Pharmacy	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
2	Inpatient Pharmacy	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
3	ER Pharmacy	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
4	Intravenous Admixture	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
5	TPN services	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
6	Satellite Pharmacy	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
7	Medication Safety officer	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
8	Pharmacy Total Quality management	0	10	2	4	2	0	1	1	0	0 (0%)	20 (100%)
9	Drug Information Center	0	0	0	0	0	0	1	1	0	18 (90%)	2 (10%)
10	Clinical Pharmacy Services	0	0	0	0	0	0	0	1	0	19 (95%)	1 (5%)
11	Patient Counseling	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)
12	Medication Reconciliation	0	0	0	0	0	0	0	0	0	20 (100%)	0 (0%)

No: Numbers, NR: Not Reported

Table 2: Number of Pilgrims, hospital, Beds over nine years in Al-Madina region					
Al-Madina					
Year	Pilgrims number	No of Hospitals	No of beds	No of Pilgrims / Hospital	No of Pilgrims / Bed
2006	2,378,636	4	723	594,659.00	3,289.95
2007	2,454,325	4	687	613,581.25	3,572.53
2008	2,408,849	4	755	602,212.25	3,190.53
2009	2,313,278	5	863	462,655.60	2,680.51
2010	2,789,399	4	811	697,349.75	3,439.46
2011	2,927,717	7	811	418,245.29	3,610.01
2012	3,161,573	7	811	451,653.29	3,898.36
2013	1,980,249	7	811	282,892.71	2,441.74
2014	2,085,238	9	1,255	231,693.11	1,661.54
Average	2,499,918.22	5.67	836.33	483,882.47	3,087.18

Table 3: Number of Inpatient, Emergency (ER), and Ambulatory care prescriptions over nine years in Al-Madina region										
Al-Madina										
Y (H)	Y (G)	Pilgrims number	No of Inpatient Prescriptions	Percentage from Pilgrims (%)	No of ER Prescriptions	Percentage from Pilgrims (%)	No of Ambulatory care Prescriptions	Percentage from Pilgrims (%)	Total no of Prescription	Percentage from Pilgrims (%)
1427	2006	2,378,636	4,572	0.19	42,982	1.81	31,812	1.34	79,366.00	3.34
1428	2007	2,454,325	3,553	0.14	2,283	0.09	36,014	1.47	41,850.00	1.71
1429	2008	2,408,849	2,984	0.12	7,114	0.30	110,814	4.60	120,912.00	5.02
1430	2009	2,313,278	2,782	0.12	9,492	0.41	95,173	4.11	107,447.00	4.64
1431	2010	2,789,399	2,457	0.09	11,023	0.40	119,627	4.29	133,107.00	4.77
1432	2011	2,927,717	2756	0.09	14,292	0.49	110,600	3.78	127,648.00	4.36
1433	2012	3,161,573	1,151	0.04	26,190	0.83	19,812	0.63	47,153.00	1.49
1434	2013	1,980,249	412	0.02	6,038	0.30	24,384	1.23	30,834.00	1.56
1435	2014	2,085,238	424	0.02	3,648	0.17	18,206	0.87	22,278.00	1.07
Average		2,499,918.22	2,343.44	0.09	13,673.56	0.53	62,938.00	2.48	78,955.00	3.11

Table 4: Number of calculated Full-Time Employee (FTE) based on workload at Inpatient, Emergency (ER), and Ambulatory care services prescriptions over nine years in Al-Madina region

Al-Madina									
Y (H)	Y (G)	Pilgrims number	No of Inpatient Prescriptions	FTE	No of Emergency Prescriptions	FTE	No of Ambulatory care Prescriptions	FTE	Total FTE
1427	2006	2,378,636	4,572	14.29	42,982	89.55	31,812	66.28	170.11
1428	2007	2,454,325	3,553	11.10	2,283	4.76	36,014	75.03	90.89
1429	2008	2,408,849	2,984	9.33	7,114	14.82	110,814	230.86	255.01
1430	2009	2,313,278	2,782	6.96	9,492	15.82	95,173	158.62	181.40
1431	2010	2,789,399	2,457	7.68	11,023	22.96	119,627	249.22	279.87
1432	2011	2,927,717	2756	4.92	14,292	17.01	110,600	131.67	153.60
1433	2012	3,161,573	1,151	2.06	26,190	31.18	19,812	23.59	56.82
1434	2013	1,980,249	412	0.74	6,038	7.19	24,384	29.03	36.95
1435	2014	2,085,238	424	0.59	3,648	3.38	18,206	16.86	20.82
Average		2,499,918.22	2,343.44	6.41	13,673.56	22.96	62,938.00	109.02	138.39

Table 5: Comparison of number of calculated Full-Time Employee based on workload and MOH standards over nine years in Al-Madina region

Al-Madina					
Year	No of Hospitals	No of beds	No of pharmacist MOH Standards	No of pharmacist Workload	No of fold times
2006	4	723	144.6	170.11	1.18
2007	4	687	137.4	90.89	0.66
2008	4	755	151	255.01	1.69
2009	5	863	172.6	181.4	1.05
2010	4	811	162.2	279.87	1.73
2011	7	811	162.2	153.6	0.95
2012	7	811	162.2	56.82	0.35
2013	7	811	162.2	36.95	0.23
2014	9	1,255	251	20.82	0.08
Average	5.67	836.33	167.27	138.39	0.88

pilgrims visited Al-Madina. Also, although the number of pilgrims was almost the same during the nine years; there is a decrease in the number of prescriptions in the last years, especially inpatient prescriptions. It may be a result of the outstanding efforts in decreasing mass gathering related health problems and communicable diseases. It is hard to compare the results with other studies; there is not study published yet in the world. It is the first investigations of pharmacy workforces during mass gathering Hajj performance. The study excluded the pharmacy technician 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 hospital included in Al-Madina region, complete demographic data about hospital missed in the MOH statistical books for instant bed size, hospital services, and accreditation status. Moreover, the absent of official documentation of pharmacy performance during mass gathering hajj time over entire the study, the clinical activities documentation missed, and the number and type of dispensed medication not reported during mass gathering Hajj time.

CONCLUSION

The Pharmacy workload analysis reflects the fair number of a pharmacist during mass gathering Hajj period in Al-Madina region, Saudi Arabia despite the clinical pharmacy, activities missed with emphasis on inpatient clinical performances. All pharmacy administration performances, pharmacy nonclinical and clinical activities should document during mass gathering Hajj time to an actual recalculation of pharmacist demand in the future's studies in Al-Madina region, Saudi Arabia.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

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

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