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National Workload Analysis of Network of Drug Information Centers at Ministry of Health Hospitals in Saudi Arabia

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Abstract

Objectives: To analyze the workload of the network of drug information centers at the Ministry of Health institutions, Saudi Arabia. Methods: This is a 2-month cross-sectional survey of all drug information centers at MOH hospitals. Any drug information center that has been recently opened or has provided services to the healthcare professionals and the public participated in the survey. The national, regional, and local drug information centers at healthcare institutions were included in the survey. In addition, hospitals or primary care centers (e.g., public, pediatric, maternity, and psychiatry) were also included in the survey. The survey consisted of two parts: demographics data and workload of drug information centers. The clinical activities were driven by the American College of Clinical Pharmacy model. Results: The questionnaire was distributed to around 60 drug information centers. A total of 46 centers responded to the questionnaire, with a response rate of around 76.66%. Most hospitals (11 (23.9%)) had 100–199 beds and others (11 (23.9%)) had 200–299 beds. A total of 1022.5; 22,495; and 269,940 drug information queries were received daily, monthly, and annually, respectively. The greatest demand for a full-time employee (FTE) to preform drug information activities was at the central drug information activities (20.95 FTE) followed by the administration-related drug information activities (17.98 FTE) and patient-specific drug information activities (8.41 FTE). Among the central drug information activities, the highest amount of activity was observed for in-service training (10.95 FTE), whereas among the administration-related drug information activities, the highest amount of activity was observed for attending lectures/courses/symposium/training (2.46 FTE). Among the patient-specific drug information activities, the highest amount of activity was observed for patient counseling services (3.43 FTE). Conclusion: The workload of drug information centers was found to be very high. The services were needed to be revised within basic and advanced requirements of drug information centers at the Ministry of Health, Saudi Arabia.

Key words: Workload, Network, Drug Information Centers, Ministry of Health, Saudi Arabia.

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INTRODUCTION

In early 2013, National Drug Information Center was founded at the Ministry of Health (MOH).[1] In 2014, the network of drug information centers was spanning over 20 regions with more than 50 centers.[2] All these centers provide several healthcare services including operative clinical activities. They operate with the help of several basic requirements including equipment, personnel, and administrative services. The drug information centers' human resources is a potential element of such requirements. The calculation of workforce demand is required including the analysis of clinical activities with entire organizations or throughout outsource institutions Several studies have focused their research on cost avoidance of drug information

services.[3–9] However, to the best of our knowledge, studies regarding the personal workforce and clinical activities are scarce around the world and in the Middle East countries including Saudi Arabia. Therefore, in this study, we aimed to explore the workload of drug information centers in the Kingdom of Saudi Arabia.

METHODS

This is a 2-month cross-sectional survey of all drug information centers at MOH hospitals. Any drug information center that has been recently been opened or has provided services to the healthcare professionals and the public participated in the survey. The national, regional, and local drug information centers at healthcare institutions were included in the survey. In addition, hospitals and primary care centers (public, pediatric, maternity, psychiatry) were also included in the survey. The survey consisted of two parts: demographics data which consisted of several parts: (1) workload of drug information centers; (2) cost analysis of drug information centers' foundations; (3) cost analysis of drug information activity; and (4) questions about education and training activity of drug information centers. The clinical activities are driven by the American College of Clinical Pharmacy (ACCP model of clinical activities.[10] The central drug information activities, patient-centered drug information activity, and Administrative drug information activities. All calculation were performed by using an electronic Survey Monkey system with emphasis on the workload of drug information centers.

RESULTS

The survey was distributed to 60 drug information centers with a total responders of 46; thus, the response rate was found to be 76.66%. Most hospitals (11 (23.9%)) had 100–199 beds and others (11 (23.9%)) had 200–299 beds. Most hospitals were accredited to the Saudi Center for Accreditation of Healthcare Institutions (CBAHI (27 (58.7%)) and to the Saudi Commission of Health Specialties (9 (19.6%)), whereas 11 (23.9%) hospitals were not accredited by any organization. Most of the drug information centers were for adults (20 (43.48%)) and General (15 (32.61%)) followed by the psychiatric (5 (10.87%)) and pediatrics centers (4 (8.7%)) (Table 1). Among all the responders, 43 (95.6%) were Saudi and 2 (4.4%) were non-Saudi responders. Age of most responders (44 (95.7%)) was in the range of 18–40 years. The highest level of education of the responders was Bachelor of Pharmacy (22 (47.83%)), Doctor of Pharmacy (11 (23.9%)), and Master of Science (9 (19.57%)). Only 4 (10%) responders were certified and specialized in pharmaceuticals. Most of the responders (30 (65.2%)) had 1–6 years of experience at drug information centers, whereas others eight (17.39 %) has experience in clinical pharmacy (Tables 2 and 3). The total number of drug information queries at all 46 hospitals was 1022.5; 22,495; and 269,940 on daily, monthly, and annually, respectively. Of those, psychiatric (8.93), neonatal critical care (6.84), and medical departments (4.48) received the highest number of daily queries than that of other departments. The pharmacy unit received questions on an average regarding outpatient pharmacy (4.95) and inpatient pharmacy (4.75) per day (Tables 4 and 5). Among the number of drug information queries, 382.5 (37.4%) queries were received by the head of drug information center, 355 (34.72%) were received by the pharmacist, and 285 (27.87%) were received by the clinical pharmacist daily at all hospitals. The average time needed to answer a single query was around 9.34 min. A total of (0.47 FTE) was needed to answer queries at each center, whereas an average of (1.85 FTE) pharmacist and an average of (2.46 FTE) were needed at each drug information center (Tables 6 and 7). The most available staff member at drug information center was pharmacy technician followed by a regular pharmacist. The average space of drug information center was around 11.72 m^2, whereas the pharmacy technician's room and clinical pharmacist's room inside the drug information center had the greatest room size (Table 8). The greatest demand for an FTE was for the central drug information activities (20.95 FTE) followed by the administration-related drug information activities (17.98 FTE) and the patient-specific drug information activities (8.41 FTE). The highest amount of activity among the central drug information activities was observed for in-service training (10.95 FTE). Furthermore, the highest amount of activity among the administration-related drug information activities was observed for attending lectures/courses/symposium/training (2.46 FTE), and among the patient-specific drug information activities, it was observed for patient counseling services (3.43 FTE) (Table 9).

DISCUSSION

The network of drug information centers was founded in 2014 after the national drug information center was founded.[1,2] The network was organized by a central committee of drug information at the General Administration of Pharmaceutical Care at MOH.

Table 1: Hospitals' demographic information.		
Number of beds at the hospital	**Response Count**	**Response Percent**
< 50	7	15.2%
50-99	6	13.0%
100-199	11	23.9%
200-299	11	23.9%
300-399	4	8.7%
400-499	4	8.7%
= or > 600	3	6.5%
Medical City	0	0.0%
Answered question	46	
Skipped question	0	
The hospital accreditation	**Response Count**	**Response Percent**
CIBAHI	27	58.7%
Joint Commotion the USA	7	15.2%
Canada	1	2.2%
Saudi commission on health accreditation	9	19.6%
Non accredited	11	23.9%
Answered question	46	
Skipped question	0	
The type of drug information center	**Response Count**	**Response Percent**
General Drug Information Center	15	32.61%
Adult drug information center	20	43.48%
Pediatric drug information center	4	8.70%
Psychiatric drug information center	5	10.87%
Oncology drug information center	0	0.00%
Cardiology drug information center	1	2.17%
Dental drug information center	0	0.00%
Primary health care drug information center	1	2.17%
Answered question	46	
Skipped question	0	

It consists of representatives from 20 regions. The committee comprises specialized clinical pharmacists and trained pharmacists. The network provides essential functions of international standards related to drug information services.[11] However, till date, the workload of activities of drug information centers has not been studied separately. Most of the studies have focused their research on workload of clinical pharmacy services.[10,12] The analysis of workload requires the calculation of workforce demand and cost of drug information centers. The authors of this study have tried to explore the workload analysis of drug information services at the MOH in Saudi Arabia. According to our results, most of the drug information centers were general and for adults followed by the psychiatric and pediatric centers. This is expected because most of the adults or general hospitals had opened these services, whereas not all pediatric or psychiatric hospitals had opened drug information centers. However, it is noteworthy that around 25% and 5% of the drug information centers belonged to the psychiatric or pediatrics hospitals, respectively. Most the drug information pharmacists were Saudi nationals with a bachelor's degree; there were a smaller number of pharmcists with Doctor of Pharmacy and Master of Science degree. This is expected because until now, the MOH hospitals do not have enough number of clinical pharmacists. Alamri *et al.* also reported similar results with respect to the bachelor's degree, whereas the number of Doctor of Pharmacy and Master of Science degrees more than what reported by Alamri *et al* because the the current study covered wide range number of regions.[13] The average number of queries received by the

Table 2: Demographic information regarding responder's qualifications.		
Nationality	**Response Count**	**Response Percent**
Saudi	43	95.6%
Non- Saudi	2	4.4%
Answered question	45	
Skipped question	1	
Gender	**Response Count**	**Response Percent**
18-40 years	44	95.7%
40 - 65 years	2	4.3%
18- 40 years	0	0.0%
more than 65 years	0	0.0%
Answered question	46	
Skipped question	0	
Academic Qualification (s):	**Response Count**	**Response Percent**
Diploma Pharmacy	7	15.22%
Bsc. Pharm	22	47.83%
M.S	9	19.57%
Msc. Clinical Pharmacy	6	13.04%
Pharm.D.	11	23.91%
Ph.D	0	0.00%
MBA	3	6.52%
Pharmacy Residency Two years (R1)	1	2.17%
Pharmacy Residency one year (R2)	0	0.00%
Fellowship	1	2.17%
Others	1	2.17%
Answered question	46	
Skipped question	0	
Total years worked as a pharmacist	**Response Count**	**Response Percent**
Board Certified Ambulatory Care Pharmacist (BCACP)	0	0.0%
Board Certified Critical Care Pharmacist (BCCCP)	0	0.0%
Board Certified Nuclear Pharmacist (BCNP)	1	2.5%
Board Certified Nutrition Support Pharmacist (BCNSP)	0	0.0%
Board Certified Oncology Pharmacist (BCOP)	0	0.0%
Board Certified Pediatric Pharmacy Specialist (BCPPS)	1	2.5%
Board Certified Pharmacotherapy Specialists (BCPS)	1	2.5%
Board Certified Psychiatric Pharmacist (BCPP)	1	2.5%
Non	39	97.5%
Others	1	2.5%
Answered question	40	
Skipped question	6	

drug information center was found to be varied. These results agree with those reported by Alomi *et al.* and are more than what has been reported by Matuszewski *et al.*[2,14] Most queries originated from the medical and psychiatric department and neonatal units. This is expected because several drug-related problems, such as adverse events and multiple drug–drug interactions, were related to the general medical and antipsychotic medications. In addition, the other reason could be that the psychiatric hospital must have just started their drug information services. The neonatal department did not have clinical pharmacist, which needs to closely monitor

Table 3: Years of experience.

Answer Options	Pharmacy Practice	Clinical Pharmacy	Pharmacy Administration	Drug information services	Response Count
0	2	7	3	3	13
< 1 year	3	5	4	6	16
1-3	8	5	9	14	24
4-6	17	3	7	16	28
> 6 years	23	5	11	8	29
answered question					**46**
skipped question					**0**

Table 4: The average number of questions received from hospital's departments on a daily basis.

Answer Options	The number of responders is not received a question	The number of responders received a question	Response Count	Total number of question received	Average number of question per each hospital	FTE
Adults Emergency	9	36	45	195	5.42	0.011
Pediatrics Emergency	14	31	45	157.5	5.08	0.011
Adults Critical Care	12	33	45	172.5	5.23	0.011
Pediatrics Critical Care	22	22	44	115	5.23	0.011
Neonates Critical Care	26	19	45	130	6.84	0.014
Medical	3	42	45	230	5.48	0.011
Surgical	9	36	45	135	3.75	0.008
Pediatrics	11	34	45	155	4.56	0.009
Psychiatry	24	21	45	187.5	8.93	0.019
Obstetrics and Gynecology	22	23	45	97.5	4.24	0.009
Anesthesia and Operation	24	21	45	97.5	4.64	0.010

Table 5: The average number of questions received from pharmacy department daily.

Answer Options	The number of responders is not received a question	The number of responders received a question	Response Count	Total number of question received	Average number of question per each hospital	FTE
Inpatient pharmacy	6	40	46	190	4.75	0.010
IV admixture Pharmacy	24	21	45	54	2.57	0.005
Outpatient pharmacy	4	41	45	203	4.95	0.010
Satellite pharmacy	34	11	45	33	3.00	0.006
Emergency pharmacy	15	30	45	102	3.40	0.007
Drug information	20	26	46	124	4.77	0.010
Clinical Pharmacy	25	20	45	87	4.35	0.009
Preparation area	20	25	45	90	3.60	0.008
Prepackaging area	31	12	43	36	3.00	0.006
Pharmacy Store	18	27	45	74	2.74	0.006

Table 6: The average number of questions answered and time needed to answer each question by the following daily.

Answer Options	Total number of question	Average number of question	Response Count	Total time needed to answer each question min	average time needed to answer each question (min)	Response Count	FTE
Head of drug information center	382.5	8.50	45	425	10.89	45	0.19
Clinical Pharmacist	285	7.13	40	257.5	8.85	37	0.13
Pharmacist	355	8.45	42	230	8.29	38	0.15

Table 7: The total number of staff for drug information centers.

Answer Options	The number of responders, not staff existed	The number of responders staff existed	Response Count	Total number of staff	Average number of staff per each center
Head of drug information center	5	41	46	50	1.22
Clinical Pharmacist	32	14	46	24	1.71
Pharmacist	25	21	46	55	2.62
Pharmacy technician	38	7	45	47	6.71
Secretary	39	6	45	6	1.00
Porter	40	6	46	9	1.50

Table 8: The size location of the following areas in meter square (m^2).

Answer Options	The number of responders answered not existed space	The number of responders answered existed space	Response Count	The total size of DIC space	The average size of DIC space
Head of drug information center office	14	32	46	347	10.84
Clinical Pharmacist office	35	9	44	140	15.56
Pharmacist office	30	11	41	138	12.55
Pharmacy technician office	39	5	44	78	15.60
Secretary office	39	6	45	37	6.17
Porter Office	38	6	44	65	10.83
ALL drug information space	16	29	45	340	11.72

the dosing standardization. Related to the pharmacy section, the most units of the pharmacy departments asked drug information was outpatient pharmacy and inpatient pharmacy. This may be related to the absence of library in pharmacy at their units, or there were many patients who needed intervention. Most of the human resources at drug information center were pharmacists, head of drug information centers, and pharmacy technicians. that's related few number of clinical pharmacist operates drug information center. Also, some hospital may utilized pharmacy technician to operate or assisted in operation of the drug information services as alternatives of pharmacists.

Based on the workload analysis of drug information queries, the average number of human resources per each center was found to be less than one, whereas the total number of staff at the drug information centers was found to be greater than what has been calculated. This shows that there a less workload when compared to the staff. This is related to the low number of activities at the drug information centers because the national drug information services have been recently started at the MOH hospitals. The number of pharmacists in this study were found to be more than what has been reported by Alamri *et al.*[13] The average size of the room of drug information services is acceptable with

Table 9: Drug Information Services (DIS) Workload Analysis.				
No.	**Type of Task & Activity**	**Average number of activities percenter**	**The average time of activities per center (hours)**	**FTE**
I	**Central Drug Information Activities**			
I.1	**Pharmacoeconomic Services**			
I.1.1	Drug Utilization Evaluation (DUE)	6.35	1.72	1.37
I.1.2	Cost reduction project (Pharmacoeconomics)	3.61	1.67	0.76
Subtotal		**9.96**	**3.39**	**2.13**
I.2	**In-Services Education**			
I.2.1	Deliver seminar and Presentation or Lecture	4.50	1.26	0.71
Subtotal		**4.50**	**1.26**	**0.71**
I.3	**In-Services Training**			
I.3.1	Residency Training	8.75	1.98	2.16
I.3.2	Pharmacist Training	8.17	2.03	2.08
I.3.3	Pharmacy technician training	6.04	1.85	1.40
I.3.4	Pharmacist Student Training	8.75	1.89	2.06
I.3.5	Pharm D student training	7.72	2.04	1.97
I.3.6	Pharmacy technician student training	6.00	1.70	1.28
Subtotal		**45.43**	**11.49**	**10.95**
I.4	**Drug Information Services**			
I.4.1	Respond to Drug Information Questions	26.81	1.26	4.23
Subtotal		**26.81**	**1.26**	**4.23**
I.5	**Poisoning Information Services**			
I.5.1	Provider of Poison Information	4.05	0.45	0.23
Subtotal		**4.05**	**0.45**	**0.23**
I.6	**Clinical Researeches and Publication**			
I.6.1	Perform clinical research, publishing articles	3.57	2.31	1.03
I.6.2	Prepare and Publish Newsletter	6.00	2.23	1.67
Subtotal		**9.57**	**4.54**	**2.7**
Grand total		**100.32**	**22.39**	**20.95**
II	**Patient-Specific Drug Information Activates**			
II.1	ADR (Identification & Reporting)	8.68	0.57	0.62
II.2	Medications Errors preventing and monitoring	14.76	0.89	1.64
II.3	Ambulatory care clinic participation	6.07	1.11	0.84
II.4	CPR team participation	3.82	0.88	0.42
II.5	Pharmacokinetic consultation	6.25	0.98	0.76
II.6	Nutrition Support	6.07	0.93	0.70
II.7	Patient Counseling	18.41	1.49	3.43
Total		**64.06**	**6.85**	**8.41**
III	**Administration-Specific Drug Information Activates**			
III.1	Planning of clinical pharmacy services	5.92	1.70	1.26
III.2	Writing statistical report	10.58	1.68	2.22
III.3	Policies and Procedure design	8.57	2.18	2.33
III.4	Filing of forms/ preparation of minutes	7.66	1.75	1.67

III.5	Attending Lectures/ Courses/ Symposium/ Training	9.32	2.11	2.46
III.6	Helping in Drug Cases from Outside Formulary system	5.77	1.24	0.89
III.7	Appointments with Pharmaceutical Co. representatives	5.54	1.08	0.75
III.8	Supervising Drug Information Services	9.74	1.80	2.19
III.9	Participate in Pharmacy and Therapeutic Committee	6.94	1.21	1.05
III.10	Develop update Hospital Formulary	5.32	2.23	1.48
III.1I	Setting and evaluating therapeutic guidelines	6.21	2.16	1.68
Total		**81.57**	**19.14**	**17.98**

the current level of activities, but it is not acceptable to the number of members in the staff, which means there is a need for expansion. This result was found to be lower than what has been reported by Lim *et al.*[15] The results of our analysis showed that there is a great demand of FTEs because of number of activities and increased time needed to perform those activities. The second highest amount activities were observed for administration-related activities than that of patient-specific activities. This is an acceptable finding because most of the activities are not directly related to the patient. The highest amount of activity performed by drug information services was observed in case of training services to the pharmacist and pharmacy student; the next highest was the patient answering the drug information queries, whereas third highest was the counseling and attending the educational symposium. The results reflect the actual practice. Those common activities done by drug information pharmacist. Activities such as drug utilization, researches, publication, or direct patient care were taken care by most of the working staff with bachelor's degree, and they were regular training pharmacists and not clinical pharmacists. The actual demand for the drug information FTE for activities was higher than what has been practiced. Because the activities not done all or properly and takes less time. Our results of drug information activities were found to be more than those reported by Alomi; this might be because of the wide range of the center with more additional activities with reflected in reality.[16] Other findings were difficult to compare due to the lack of information. The workload of drug information centers was high with recommended activities. The drug information centers pharmacists needed more education and training to focus on more activities related to the drug information services with cost avoidance and prevention of drug-related problems.

CONCLUSION

Despite the high workload of drug information services, there is a great demand for personnel related to human resources, facilities, and financial support. Targeting to review all requirements of drug information services is highly recommended at MOH in Kingdom of Saudi Arabia.

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None.

CONFLICT OF INTEREST

None.

ABBREVIATIONS

ACCP, American College of Clinical Pharmacy; FTE, full-time employee; KSA, Kingdom of Saudi Arabia; MOH, Ministry of Health; CBAHI, Saudi Center for Accreditation of Healthcare Institutions.

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