

Cost Analysis of Activities for Network Drug Information Centers at the Ministry of Health Hospitals in Saudi Arabia

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Abstract

Objectives: In this study, we aimed to analyze the cost of network drug information services at the Ministry of Health (MOH) hospitals in Saudi Arabia. **Method:** In this study, we simulated the 2-month cross-sectional survey data of all drug information centers at the MOH hospitals. Any drug store that has provided services to the healthcare professionals and the public participated in the questionnaire. National, regional and local drug information centers in the healthcare institutions participated in this survey. All type of hospitals or primary care centers (e.g. public, pediatric, maternity and psychiatry) were included in this study. The survey consisted of two parts: the first part collects demographics data and the second part analyzes the cost of activities of drug information centers. The clinical activities were derived from the model of the American College of Clinical Pharmacy (ACCP). The type cost consisted of related central drug information activities, the cost of the patient-centered drug information activity and the cost of Administrative drug information activities. All cost used US dollar currency. **Results:** The survey was distributed to 60 drug information centers and a total of 46 centers responded to the survey; the response rate was 76.66%. Most of the hospitals (11 (23.9%)) had 100–199 beds and the others (11 (23.9%)) had 200–299 beds. The total daily cost of drug information activities was 6,002.18 USD. The highest cost of drug information activities was central drug information activities (2,654.69 USD (44.23%)) followed by the administration of drug information activities (2,280.59 USD (37.99%)) and patient-specific drug information activities (1,066.9 USD (17.77%)). The highest daily cost of drug information activities among central drug information center was responding to drug information inquiries ((536.24 USD)) followed by the residential training ((9274.46 USD)) and pharmacist's training ((263.14 USD)). **Conclusion:** The central activities of drug information centers costed the highest. Expanding the services to patient-specific activities will decrease morbidity, mortality and justify cost analysis at MOH hospitals in Saudi Arabia.

Key words: Cost Analysis, Network, Drug Information Centers, Activities, Ministry of Health, Saudi Arabia.

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INTRODUCTION

The Drug information centers (DICs) provide several activities and services to healthcare professionals and patients. The American Society of Health-System Pharmacists explored the functions of drug information

services.^[1] The DICs services are provided to the inside or outside of healthcare organization. The DICs may contract with public or private institutions for outsourcing their services. All services are needed for the quantification of the cost services. Several investigations have been published regarding the cost avoidance of

drug information centers.^[2-8] However, to the best of our knowledge, there are no studies regarding the cost of drug information services in overseas countries or in local Middle Eastern countries. Therefore, in this study, we aimed to explore the cost analysis of drug information services in the Kingdom of Saudi Arabia (KSA).

METHODS

In this study, we simulated the 2-month cross-sectional survey data of all the drug information centers at the Ministry of Health hospitals, Saudi Arabia. Any drug store that has provided services to the healthcare professionals and the public participated in the questionnaire. All types of drug information centers (national, regional or local) were included in the survey. All type of hospitals and primary care centers were included in the survey (public, pediatric, maternity and psychiatry). The survey consisted of two parts: the first part collects demographic data and the second part consists of a questionnaire on four domains. (1) the first domain is regarding workload of drug information centers; (2) the second domain is regarding cost analysis of drug information centers; (3) the third domain is related to cost analysis of drug information activities; and (4) the fourth domain is about education and training activity of drug information centers. This article discusses the third domain. It includes the clinical activities derived from the model of the American College of Clinical Pharmacy (ACCP),^[9] which includes the costs of central drug information activities, patient-centered drug information activities and administrative drug information activities. All costs were calculated in US dollar currency. All analysis were conducted in an electronic Survey Monkey system.

RESULTS

The survey was distributed to 60 drug information centers among which 46 responded; the response rate was 76.66%. Most of the hospitals (11 (23.9%)) had 100–199 beds and the others (11 (23.9%)) had 200–299 beds. Most of the hospitals had accreditation from the Central Board of Accreditation for Healthcare Institutions, Saudi Arabia (CBAHI) (27 (58.7%)) and 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 specialties 15 (32.61%) followed by psychiatric drug information centers (5 (10.87%)) and pediatric drug

Table 1: Hospital's 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	

information centers (4 (8.7%)) (Table 1). Among the responders, 43 (95.6%) were Saudi and 2 (4.4%) were non-Saudi nationals. The patients belonged to the age group of 18–40 years (44 (95.7%)). 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 in the field of pharmaceutical specialties. Most of the responders (30 (65.2%)) had an experience of 1–6 years with drug information services, whereas 8 (17.39%) responders had clinical pharmacy experience (Tables 2 and 3). The highest average salary of the head of the drug information pharmacist was 143.68 USD per day, followed by the regular pharmacist (132.26 USD) and clinical pharmacist (128.34 USD)

Table 2: Demographic information regarding responder's qualification.

Nationality	Response Count	Response Percent
Saudi	43	95.6%
Non- Saudi	2	4.4%
Answered question	45	
Skipped question	1	
Age	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	

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

Answer Options	Table 4: The monthly salary of staff at drug information centers.							
	total number of staff for drug information centers	Average number of staff per each drug information centers	Response Count	Total salary	Average salary per month	Average salary per day	Average salary per hour USD	Response Count
Head of drug information center	50	1.09	46	129,600.00	3,160.98	143.68	17.96	41
Clinical Pharmacist	24	0.52	46	96,000.00	2,823.53	128.34	16.04	34
Pharmacist	55	1.20	46	98,933.33	2,909.80	132.26	16.53	34
Pharmacy technician	47	1.04	45	70,400.00	2,270.97	103.23	12.90	31
Secretary	6	0.13	45	34,933.33	1,126.88	51.22	6.40	31
Porter	9	0.20	46	35,733.33	1,152.69	52.39	6.55	31

Table 5: The cost of drug information clinical activities.

Type of activities	frequent are services provided by Drug Information Services monthly					time consumed for each service provided by Drug Information center monthly					Average time needed per activity daily	The average cost of activity daily USD	
	There no activities existed	There are activities existed	Response Count	Total Number of events	Average number of events percenter	There no activities existed	There are activities existed	Response Count	Total Number of hours	Average hours percenter			Average time needed per event
Cost of Central Drug Information Activities													
Pharmacoeconomic Services													
Drug Utilization Evaluation (DUE)	21	24	45	152.5	6.35	19	23	42	39.63	1.72	10.95	1.37	173.53
Cost reduction project (Pharmacoeconomics)	34	9	43	32.5	3.61	30	12	42	20.08	1.67	6.04	0.76	95.78
In-Services Education													
Deliver seminar and Presentation or Lecture	16	30	46	135	4.50	12	31	43	38.96	1.26	5.66	0.71	89.64
In-Services Training													
Residency Training	34	8	42	70	8.75	32	10	42	19.79	1.98	17.32	2.16	274.46
Pharmacist Training	13	30	43	245	8.17	19	24	43	48.79	2.03	16.60	2.08	263.14
Pharmacy technician training	20	24	44	145	6.04	19	24	43	44.46	1.85	11.19	1.40	177.40
Pharmacist Student Training	20	24	44	210	8.75	18	25	43	47.13	1.89	16.50	2.06	261.45
Pharm D student training	20	23	43	177.5	7.72	17	26	43	53	2.04	15.73	1.97	249.35
Pharmacy technician student training	23	20	43	120	6.00	22	21	43	35.71	1.70	10.20	1.28	161.72
Drug Information Services													
Respond to Drug Information Questions	5	40	45	1072.5	26.81	5	39	44	49.21	1.26	33.83	4.23	536.24
Poisoning Information Services													
Provider of Poison Information	15	29	44	117.5	4.05	14	28	42	12.71	0.45	1.84	0.23	29.15
Clinical Researches and Publication													
Perform clinical research, publishing articles	31	14	45	50	3.57	30	13	43	30.04	2.31	8.25	1.03	130.81
Prepare and Publish Newsletter	24	20	44	120	6.00	24	18	42	40.13	2.23	13.38	1.67	212.02
Cost of Patient-Specific Drug Information Activities													
ADR (Identification & Reporting)	10	36	46	312.5	8.68	11	33	44	18.75	0.57	4.93	0.62	78.17
Medications Errors preventing & monitoring	5	41	46	605	14.76	5	38	43	33.75	0.89	13.11	1.64	207.73
Ambulatory care clinic participation	22	21	43	127.5	6.07	18	24	42	26.67	1.11	6.75	0.84	106.94
CPR team participation	24	19	43	72.5	3.82	22	21	43	18.46	0.88	3.35	0.42	53.17
Pharmacokinetic consultation	19	24	43	150	6.25	18	24	42	23.5	0.98	6.12	0.76	97.00
Nutrition Support	29	14	43	85	6.07	27	15	42	13.92	0.93	5.63	0.70	89.30
Patient Counseling	10	33	43	607.5	18.41	7	35	42	52.13	1.49	27.42	3.43	434.59
Cost of Administration-Specific Drug Information Activities													
Planning of clinical pharmacy services	24	19	43	112.5	5.92	21	21	42	35.75	1.70	10.08	1.26	159.77
Writing statistical report	14	30	44	317.5	10.58	14	29	43	48.58	1.68	17.73	2.22	281.00
Policies and Procedure design	9	35	44	300	8.57	12	31	43	67.46	2.18	18.65	2.33	295.64
Filing of forms/ preparation of minutes	11	32	43	245	7.66	14	29	43	50.67	1.75	13.38	1.67	212.03

Table 5: The cost of drug information clinical activities.

Type of activities	frequent are services provided by Drug Information Services monthly					time consumed for each service provided by Drug Information center monthly					Average time needed per activity daily	The average cost of activity daily USD	
	There no activities existed	There are activities existed	Response Count	Total Number of events	Average number of events percenter	There no activities existed	There are activities existed	Response Count	Total Number of hours	Average hours percenter			Average time needed per event
Attending Lectures/ Courses/ Symposium/ Training	10	33	43	307.5	9.32	11	33	44	69.67	2.11	19.67	2.46	311.81
Helping in Drug Cases from Outside Formulary system	17	26	43	150	5.77	17	25	42	30.96	1.24	7.14	0.89	113.24
Appointments with Pharmaceutical Co. representatives	20	23	43	127.5	5.54	21	21	42	22.71	1.08	5.99	0.75	95.02
Supervising DIC Services	14	29	43	282.5	9.74	8	35	43	63	1.80	17.53	2.19	277.92
Participate on Pharmacy and Therapeutic Committee	10	36	46	250	6.94	7	36	43	43.71	1.21	8.43	1.05	133.64
Develop update Hospital Formulary	13	31	44	165	5.32	8	34	42	75.75	2.23	11.86	1.48	187.96
Setting and evaluating therapeutic guidelines	13	31	44	192.5	6.21	14	29	43	62.63	2.16	13.41	1.68	212.56

Table 6: The cost of shared drug information center in the hospital committees.

Type of committees	The frequency of the drug information center participate in relevant hospital committees annually as following					Time consumed for each committee					The average cost of activity daily USD
	There no committee existed	There is committee existed	Response Count	Total Number of events	Average number of events percenter	Response Count	Total Number of hours	Average hours percenter	Average time needed per each committee	FTE hr	
Pharmacy and Therapeutic Committee	7	38	45	152	4.00	44	42.25	0.96	3.84	0.48	60.86
Antibiotics Committee	15	28	43	78	2.79	38	28.5	0.75	2.09	0.26	33.12
DUE Committee	32	10	42	33	3.30	35	21.25	0.61	2.01	0.25	31.91
Infection Control Committee	24	18	42	74	4.11	34	20	0.59	2.43	0.30	38.45
CPR Committee	27	16	43	55	3.44	36	23.5	0.65	2.23	0.28	35.41
Morbidity and Mortality Committee	34	8	42	29	3.63	31	13.25	0.43	1.56	0.19	24.71
Patient or Medication Safety Committee	13	31	44	78	2.52	38	30.75	0.81	2.04	0.25	32.30
Pharmacy and Nursing Committee	23	20	43	62	3.10	36	26.75	0.74	2.29	0.29	36.36
Quality Management Committee	22	23	45	97	4.22	37	29	0.78	3.29	0.41	52.14
Pain Management Committee	29	13	42	39	3.00	33	18.5	0.56	1.68	0.21	26.63
Anticoagulation Committee	31	10	41	25	2.50	34	18.25	0.54	1.35	0.17	21.40
IV Therapy Committee	32	10	42	25	2.50	34	15.5	0.46	1.15	0.14	18.23

(Table 4). The total daily cost of drug information activities was 6,002.18 USD. The highest cost of drug information activities was for central drug information activities (2,654.69 USD (44.23%)) followed by the administration of drug information activities (2,280.59 USD (37.99%)) and patient-specific drug information activities (1,066.9 USD (17.77%)). The highest daily cost of activities at the central drug information center was toward responding to drug information inquiries (536.24 USD) followed by residential training (274.46 USD) and pharmacist training (263.14 USD). With respect to the administration of drug information activities, the highest daily cost was recorded toward attending lectures, courses and symposiums (311.24 USD), policy and procedures (295.64 USD) followed by writing statistical reports (281 USD) and supervising drug information activities (277.92 USD). The patient-specific drug information activity with the highest daily cost was recorded toward patient counseling (434.59 USD) followed by detection and prevention of medication errors (207.73 USD) and ambulatory care clinic activities (106.94 USD) (Table 5). The highest daily cost of participation of drug information centers in the committee per day was pharmacy and therapeutics committee (60.86 USD) followed by quality management committee (52.14 USD) and infection control committee (38.45 USD) (Table 6).

DISCUSSION

The drug information services are required as a part of the pharmacy services based on national or international standards.^[10] These services can be provided by establishing drug information centers or outsourcing the services through specialized centers. However, outsourcing of drug information services requires that the cost of activities and time needed to perform them are already known. In addition, if the hospital's pharmacy wishes to deliver the services to other organizations, then they need to know the cost of drug information activities. Therefore, we explored the cost analysis of drug information activities at the Ministry of Health hospitals in the Kingdom of Saudi Arabia. The findings of the study showed the total cost of drug information daily activities was high with most of the cost related of the central drug of information activities because most of the time spent on that is one. Followed by administration drug information services less time spent on that activity and patient-specific services because the lowest time spent with pharmacy staff. Among the central activities, the answering of drug information inquiries the highest cost and representative

highest time spent while all training section more cost. However, the individual separated training program between residency and pharmacy student. That is a common finding because the highest time and workforce required. In the administration section, the attending symposium the highest cost related to time spent while in the patient-specific the patient counseling was the highest cost due same previous reason. The cost of pharmacy and a therapeutic committee was the highest cost and it was normal because more time in the committee with more activities needed. Followed by quality management and infection control with the highest time needed and following high-cost related activities. The previous findings are difficult to compare with other investigation because of the lacking of information data nationally or internationally. All previous activities are first time calculated and it very useful for outsourced contact or privatizations and fit with new Saudi vision 2030 and Ministry of Health plan in the Kingdom of Saudi Arabia.^[11-12]

CONCLUSION

The cost analysis of drug information centers activities is essential to the calculated cost efficiency of drug information services. The common and administration drug information centers services activities are the highest cost. The providing services to other hospitals as outsourced fill with the new vision of Ministry of Health strategic plan in the Kingdom of Saudi Arabia.

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None.

CONFLICT OF INTEREST

None.

ABBREVIATIONS

MOH: Ministry of Health; **ACCP:** American College of Clinical Pharmacy; **DICs:** Drug information centers; **KSA:** Kingdom of Saudi Arabia.

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