

Cost Analysis of Combined Emergency and Outpatient Pharmacy Services in the Kingdom of Saudi Arabia

Mona Yaser Alsheikh,* PharmD, MSc, PhD, FHEA

Department of Clinical Pharmacy, College of Pharmacy, Taif University, KSA.

Asma Saqer Alamri, Pharm D

College of Pharmacy, Taif University, KSA.

Raghad Abdulaziz Alasmari, Pharm D

College of Pharmacy, Taif University, KSA.

Bandar Awwadh Alosaimi, Pharm D

College of Pharmacy, Taif University, KSA.

Yousef Ahmed Alomi,  BSc. Pharm,

MSc. Clin Pharm, BCPS, BCNSP, DiBA, CDE

Critical care Clinical Pharmacists, TPN

Clinical Pharmacist, Freelancer Business

Planner, Content Editor, and Data Analyst,

Riyadh, KSA.

Correspondence:

Dr. Yousef Ahmed Alomi, BSc. Pharm,

MSc. Clin Pharm, BCPS, BCNSP, DiBA, CDE,

Critical Care Clinical Pharmacists, TPN

Clinical Pharmacist, Freelancer Business

Planner, Content Editor and Data Analyst,

Riyadh 11392, Riyadh, Saudi Arabia.

Phone no: +966504417712

E-mail: yalomi@gmail.com

Received: 10-09-2021;

Accepted: 10-12-2021.

Copyright: © the author(s), publisher and licensee Pharmacology, Toxicology and Biomedical Reports. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License

Access this article online



www.ptbreports.org

DOI:
10.5530/PTB.2022.8.3

ABSTRACT

Objectives: In this study, we aimed to declare the cost of combined outpatient and emergency pharmacy services in the Kingdom of Saudi Arabia. **Methods:** This is a cross-sectional questionnaire-based study. We used an electronic survey with a judgment sampling system to obtain responses. The structured questionnaire consisted of two parts written in English and Arabic. The first part collected demographic information of the responders based on multiple-choice questions. The second part contains questions for measuring the personal cost, overhead cost for the place, and the equipment used for pharmaceutical services in the combined outpatient and emergency pharmacy, the cost of purchased materials and supplies, and non-salary cost. All costs used US dollar currency. The data were collected through the SurveyMonkey system and analyzed via Microsoft Excel version 2020.

Results: The total of judgment responders was nine directors of pharmacy. For more than six years, most pharmacy directors had experience in an emergency pharmacy, outpatient pharmacy, and pharmacy administration. A total of 100–199 occupational beds were present (33.33%), followed by <50 beds (22.22%) and 400–499 beds (22.22%). The total daily cost of combined OPD pharmacy and emergency services was (2336.01) USD, whereas the daily cost of OPD pharmacy was (1424.97) USD. Therefore, the daily cost of emergency pharmacy services was (911.04) USD. The majority of the daily cost for combined OPD pharmacy and emergency services came from personal cost of (1526.68) USD (65.35%) and overhead cost of (695.39) USD (29.77%). The cost of preparation and dispensing at OPD pharmacy was (13.32) USD, which is the average cost per medication dispensed from OPD pharmacy. In comparison, the preparation and dispensing cost at the emergency pharmacy was 5.2 USD, the average cost per medication. **Conclusion:** This study explored the cost analysis of combined OPD and emergency pharmacy services. Therefore, we highly recommend reducing the daily cost of pharmacy services needed to implement new ambulatory care and emergency activities or Saudi Managed Care Pharmacy in the Kingdom of Saudi Arabia.

Key words: Cost, Combined, Emergency, Outpatient, Pharmacy, Kingdom of Saudi Arabia.

INTRODUCTION

The outpatient pharmacy or ambulatory care services are significant sections of a hospital's pharmacy section.¹ The American Society of Health-System Pharmacists (ASHP) released minimum standards of ambulatory care services and emergency pharmacy services guidelines in a healthcare organization. The ASHP periodically updates these guidelines.^{2,3} The Society of Hospital Pharmacists of Australia (SHPA) explored the performance and indicators of ambulatory care services and emergency pharmacy activities.^{4,5} The guidelines and standards for outpatient or emergency pharmacy services included administrative and clinical pharmacy activities.^{2,3} Moreover, Institutions of the Safe Medications Practice (ISMP) published a self-assessment of community/ambulatory care pharmacy medication safety and hospital pharmacy medications.^{6,7} All previous pharmaceutical care guidelines and recommendations are highly recommended for ambulatory care and emergency pharmacy services implementations.^{8,9} In the late 1970s, some well-known hospitals had started to provide comprehensive pharmacy services, including King Faisal Specialist Hospital and research center (KFSH&RC) and King Khalid University Hospital (KKUH) in the mid-1980s. The KFSH&RC had excellent

outpatient pharmacy services inside the hospital, then expanded to an additional one outside the hospital. They were providing services from 08:00 AM to 6:00 PM. In contrast, the emergency pharmacy was combined with an inpatient pharmacy, which worked 24/7. The ambulatory care pharmacy department currently has a main outpatient pharmacy, north tower pharmacy, discharge pharmacy, and emergency pharmacy.^{10,11}

In contrast, KKUH had vast outpatient pharmacy services working from 8:00 AM to 5:00 PM, which then continued as emergency pharmacy services that worked 24 hour through all days of week (24/7) combined with OPD pharmacy services. An additional OPD pharmacy was started after the renovation. Until now, they have worked as simple operations. However, in the late 1980s, the biggest two hospitals at MOH public services included Riyadh Central Hospital (RCH) and Maternity Central Hospital.¹¹ RCH had separated their outpatient pharmacy service ambulatory care clinics to another place for emergency pharmacy services. Then, the emergency pharmacy was combined with an inpatient pharmacy, operating until now. In comparison, MCH had combined OPD pharmacy and emergency pharmacy at a single place, continuing to provide

service until now.¹¹⁻¹³

Recent studies have reported that most hospital pharmacies have outpatient pharmacy services, few hospital pharmacies had no 11.4% outpatient services.¹⁴ The outpatient pharmacy services provided patient care to ambulatory clinics, emergency department visits, patient discharge or hospital staff, and home health care services.¹⁴ The outpatient pharmacy regularly dispenses medication and provides medication counseling to at least 81.9% of the patients with psychiatric, obstetric, and gynecologic ailments.¹⁵ Another study showed that the average waiting time for a prescription is 18.36±11.32 min, which varies from one hospital to another.¹⁶ The ambulatory care emergency pharmacy department requires a specific pharmacy workforce, equipment, material, and medical supply to perform all administrative and clinical activities with comprehensive services. The basic requirements of the foundation need a financial budget. Various studies conducted in the Kingdom of Saudi Arabia (KSA) have analyzed drug distribution systems of inpatient pharmacies for adults and the pediatric population.¹⁷⁻¹⁹ Some studies have researched clinical pharmacies providing drug information services and total parental nutrition services.²⁰⁻²² However, there are no studies conducted on cost analysis of ambulatory care services and emergency pharmacy services to the best of our knowledge. Therefore, this study aimed to analyze the cost analysis of the combined outpatient pharmacy and emergency pharmacy services in KSA.

METHODS

This is a descriptive cross-sectional questionnaire-based study. This study was conducted from October 2020 to February 2021, and we used an electronic survey with a judgment sampling system. The structured questionnaire consisted of two parts written in English and Arabic. The first part collected demographic information of the responders based on multiple-choice questions. The second part contained multiple-choice questions. Some were editorial questions to measure the personal cost, including the salary costs of the head of the pharmacy, the clinical pharmacist, the pharmacist and pharmacy technician, and the secretary and Porter per hour. In addition, information regarding the cost for the calculation of preparation time of each medication and the total prices of the overhead cost for the place and equipment used for pharmaceutical services in the combined outpatient and emergency pharmacy was collected. Furthermore, the cost of purchased materials and supplies and non-salary costs were calculated.¹⁷⁻²² The questionnaire was filled by heads of pharmaceutical care services or someone assigned. The analysis included all the governmental and private hospitals with a combined outpatient and emergency pharmacy.

In contrast, hospitals with only outpatient pharmacies, only emergency pharmacies, outpatient and emergency pharmacies at separate locations, and hospitals with emergency pharmacies combined with inpatient pharmacies were excluded from the study. Expert reviewers performed face and content validation. A pilot study was then conducted by sending the questionnaire to some hospitals to confirm the questionnaire's validity and absence of incomprehensible or misleading questions. Using an internet-based questionnaire, data were collected by judgment sampling from different KSA cities. All costs used United States dollar (USD) currency. All depreciation costs were done with all equipment with five years of life expectancy and additional three years of annual depreciation cost. The depreciation cost was not included for consumable materials. One-way sensitivity analysis was conducted to list discount prices and a variety of wage costs with 10–20%.¹⁷⁻²² The data were collected through the Survey Monkey system and analysed using Microsoft Excel version 2020. The research ethics committee approved this study at Taif University.

RESULTS

The total of responders was 9. All outpatient pharmacy supervisor responders were male (100%), and most of the directors were aged 31–40 years (44.44%). The academic qualifications of the director of the pharmacy were B.Sc. in Pharmacy (55.55%) and Diploma in Pharmacy (33.33%) (Table 1). In addition, the majority of the pharmacy directors had work experience at the emergency pharmacy, outpatient pharmacy, and pharmacy administration for more than six years (Table 2). Most responders were located in the western region (44.44%) and southern region (33.44%). Most hospitals belonged to the MOH (66.66%) or military hospital (22.22%). The total number of occupational beds was between 100 and 199 beds (33.33%), followed by <50 beds (22.22%), and between 400 and 499 beds (22.22%). The majority of the hospitals were accredited by CBAHI (77.78%) and Joint Commission (33.33%). Most of the hospitals provided care for geriatrics (88.88%), followed by pediatrics, adolescents, and adults (77.78%) (Table 3). The total daily cost of combined OPD pharmacy and emergency services was 2336.01 USD with discount prices of 10–20% (1868.81–2102.41 USD), whereas the daily cost of OPD pharmacy alone was (1424.97 USD) with discount prices of 10–20% (1139.98–1282.47 USD), and the daily cost of emergency pharmacy alone was (911.04 USD) with discount prices of 10–20% (728.83–819.94 USD). The majority of the daily cost of

Table 1: Responders Demographic Information.

Gender	Response Count	Response Percent
Male	9	100.00%
Female	0	0.00%
Answered question	9	-
Skipped question	3	-
Age	Response Count	Response Percent
22-30 years	2	22.22%
31-40	4	44.44%
41-50	2	22.22%
51-60	0	0.00%
> 60	1	11.11%
Answered question	9	-
Skipped question	3	-
Academic Qualification*	Response Count	Response Percent
Diploma Pharmacy	1	11.11%
Bsc. Pharm	5	55.56%
M.S	0	0.00%
Msc. Clinical Pharmacy	1	11.11%
Pharm.D.	3	33.33%
Ph.D	1	11.11%
MBA	1	11.11%
PGY1	0	0.00%
PGY2	0	0.00%
PGY3	1	11.11%
Fellowship	0	0.00%
Answered question	9	-
Skipped question	3	-

*Many options might be selected.

Table 2: Responders Years of Experience.

Years of Experience in the Following Sections	Emergency Pharmacy		Outpatient Pharmacy		IV Admixture		Pharmacy Administration		Total
	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	
0	25.00%	1	0.00%	0	75.00%	3	0.00%	0	4
< 1 year	66.67%	2	33.33%	1	33.33%	1	0.00%	0	3
1-3	50.00%	2	100.00%	4	25.00%	1	25.00%	1	4
4-6	20.00%	1	80.00%	4	20.00%	1	60.00%	3	5
> 6 years	66.67%	4	66.67%	4	33.33%	2	50.00%	3	6
Answered question		9		5					
Skipped question		3		1					

Table 3: Hospital Demographic Information.

Hospitals Regions	Response Count	Response Percent
Central Region	1	11.11%
North Region	0	0.00%
South Region	3	33.33%
East Region	1	11.11%
West Region	4	44.44%
Answered question	9	-
Skipped question	3	-
Type of Hospitals	Response Count	Response Percent
MOH Hospitals	6	66.67%
Military hospitals	2	22.22%
National Guard Hospital	0	0.00%
Security forces hospitals	0	0.00%
University hospital	0	0.00%
Private hospitals	1	11.11%
Answered question	9	-
Skipped question	3	-
No. of Licensed Beds	Response Count	Response Percent
< 50	2	22.22%
50-99	0	0.00%
100-199	3	33.33%
200-299	1	11.11%
300-399	0	0.00%
400-499	2	22.22%
500 and above	1	11.11%
Medical City	0	0.00%
Answered question	9	-
Skipped question	3	-
Hospital Accreditation*	Response Count	Response Percent
CBAHI	7	77.78%
Joint Commotion USA	3	33.33%
Canada	1	11.11%
Saudi Council	2	22.22%
Other	1	11.11%
Answered question	9	-
Skipped question	3	-
The Hospital Service the Following Populations*	Response Count	Response Percent
Neonates	5	55.56%
Pediatric	7	77.78%
Adolescent	7	77.78%
Adults.	7	77.78%
Geriatrics	8	88.89%
Answered question	9	-
Skipped question	3	-

*Many options might be selected.

combined OPD pharmacy and emergency services came from personal cost (1526.68 USD, 65.35%) and overhead cost (695.39 USD, 29.77%) (Tables 4 and 5). The average waiting time for the preparation and dispensing of a single medication at combined OPD and emergency pharmacy was (8.22) min, whereas at the same at OPD pharmacy alone was (5.01) min. At the emergency pharmacy, it was (3.21) min. Therefore, the cost of preparation and dispensing at OPD pharmacy was (1.62) USD per minute, and the average cost per medication dispensed from OPD pharmacy was (13.32) USD. The preparation and dispensing cost at the emergency pharmacy was (0.632) USD per minute, and the average cost per medication dispensed from OPD pharmacy alone was (8.12) USD. The preparation and dispensing cost at emergency pharmacy sections alone was (5.2) USD (Table 6).

DISCUSSION

There are various designs of outpatient pharmacy services. For instance, a single outpatient pharmacy provides patient care to ambulatory care patients, and another area of emergency pharmacy provides services to emergency care visits. Another type of one single place outpatient pharmacy offers patient care to ambulatory care patients and same time emergency care visits. It combined the outpatient and emergency pharmacy services in one location. This type of combination was established because there may be no place for outpatient and emergency pharmacy services due to hospital design. The emergency pharmacy was a newer service that the hospital administration started providing. Therefore, we simultaneously calculated the cost of combined outpatient pharmacy and emergency pharmacy services in this study. In this study, the responders were expert pharmacists with practical experience in various pharmacy practices. The finding showed that most of the combined outpatient and emergency pharmacy services were located at MOH and military sectors that resembled the hospital pharmacy in the private sector.

Moreover, outpatient and emergency pharmacy services increased the cost of delivery services than individual outpatient or emergency services. The majority of the hospital pharmacies were accredited by the CBAHI, reflecting the quality of service delivered to the patients. There were differences in the occupational beds capacity of responders hospitals, which might be good to reflect the hospital pharmacies variations in the financial budget. Thus properly, the combined outpatient and emergency model reflected the average cost. The majority of the hospital pharmacies provide services to various patients; elderly, adults, pediatric, and neonates, reflecting actual ambulatory pharmacy practice. Our results show that the cost of combined outpatient and emergency services is high, which is related to both services. The emergency pharmacy services represent almost 39% of the total ambulatory care pharmacy services provided to the patients. Most of the costs were from personal costs, which agrees with the results of previous studies.¹⁷⁻¹⁹ These results

Table 4: Cost analysis of Outpatient pharmacy or Emergency pharmacy services.

Combined Outpatient and Emergency Pharmacy				
	Outpatient Pharmacy		Emergency Pharmacy	
Personal cost	Cost per 24 hrs	Cost per hr	Cost per 24 hrs	Cost per hr
Head of pharmacy	417.86	17.41	162.96	6.79
Clinical Pharmacist	199.07	8.29	77.64	3.24
Pharmacist	363.17	15.13	141.64	5.90
Pharmacy technician	503.57	20.98	196.39	8.18
Secretary	16.83	0.70	6.56	0.27
Porter	26.18	1.09	10.21	0.43
Total	1526.68	63.61	595.4	24.81
Overhead cost	Cost per 24 hrs	Cost per hr	Cost per 24 hrs	Cost per hr
Place	541.32	22.56	211.11	8.80
Computer	7.57	0.32	2.95	0.12
Laptop	0.95	0.04	0.37	0.02
iPad	0.27	0.01	0.11	0.00
Offices	5.2	0.22	2.03	0.08
Landline telephone	1.46	0.06	0.57	0.02
Mobile	0.07	0.00	0.03	0.00
Software of inquiries documentations	0.68	0.03	0.26	0.01
Printer and fax	2.97	0.12	1.16	0.05
Copy machines	5.81	0.24	2.27	0.09
Answering machine	1.15	0.05	0.45	0.02
Small Refrigerator for medications	16.22	0.68	0.42	0.02
Medium Refrigerator for medications	5.41	0.23	0.79	0.03
Big Refrigerator for medications	50.01	2.08	6.33	0.26
Umber Cabinet for medications	0.82	0.03	2.11	0.09
Medications counter	4.87	0.20	19.5	0.81
Manager office	3.11	0.13	0.32	0.01
Chairs	0.49	0.02	1.9	0.08
Controlled medications cabinet	3.78	0.16	1.21	0.05
Medications shelves	4.33	0.18	0.19	0.01
Table for dispensing (Pinch)	4.19	0.17	1.48	0.06
Bar-code printer	0.81	0.03	1.69	0.07
Pharmacy information system	15.68	0.65	1.63	0.07
The metal partition between medications	2.78	0.12	0.32	0.01
Manual or electronic board	0.02	0.00	6.11	0.25

Boxes for losing tablets or capsules	0.34	0.01	1.08	0.05
Stapler	0.44	0.02	0.01	0.00
Staff personal cabinet	2.18	0.09	0.13	0.01
Temperature measurements machines	8.25	0.34	0.17	0.01
Humidity measurements machines	3.52	0.15	0.85	0.04
Hand washing dish	0.69	0.03	3.22	0.13
Total	695.39	28.97	270.77	11.28
Material and supply	Cost per 24 hrs	Cost per hr	Cost per 24 hrs	Cost per hr
Regular files	0.67	0.03	0.26	0.01
Medications plastic bags	23.34	0.97	9.1	0.38
Pens	0.58	0.02	0.23	0.01
Masks	1.17	0.05	0.46	0.02
Gloves	3.39	0.14	1.32	0.06
Gowns	2.33	0.10	0.91	0.04
Shoes	1.11	0.05	0.43	0.02
Small size syringe	7.34	0.31	2.86	0.12
Medium size syringe	1.89	0.08	0.74	0.03
Big side syringe	1.23	0.05	0.48	0.02
Small size Ziploc plastic bag	11.17	0.47	4.36	0.18
Medium size Ziploc plastic bag	8.95	0.37	3.49	0.15
Big size Ziploc plastic bag	5.61	0.23	2.19	0.09
Total	68.78	2.87	26.83	1.12
Non-salary cost	Cost per 24 hrs	Cost per hr	Cost per 24 hrs	Cost per hr
Head of the outpatient pharmacy	12.31	0.51	4.8	0.20
Clinical Pharmacist	6.14	0.26	2.39	0.10
Pharmacist	8.24	0.34	3.21	0.13
Pharmacy technician	15	0.63	5.85	0.24
Secretary	0.12	0.01	0.05	0.00
Porter	0.24	0.01	0.09	0.00
Internet	1.08	0.05	0.42	0.02
Library	2.03	0.08	0.79	0.03
Total	45.16	1.88	17.6	0.73

were excepted because the pharmacy staff representative higher cost than material or equipment. That makes it different from the individual outpatient or emergency pharmacy services (ambulatory care model); it needs much equipment and material cost-wise. The second type of cost was overhead cost, which agrees with the results of previous studies.¹⁷⁻¹⁹ The higher cost of combined outpatient and emergency services is reflected in preparation and dispensing costs than individual OPD pharmacies or emergency pharmacy services. That might be because of the combined quantities of medications dispensed in addition to the more significant amount of time required for the preparation and dispensing of medicines at integrated services than each OPD pharmacy or emergency alone. If we assumed two drugs from combined OPD

Continued...

Table 5: Type of Cost Derived at Combined Location Outpatient Pharmacy PLUS Emergency Pharmacy Sections.

Type of Costs	Content of Items	Combined Outpatient and Emergency Pharmacy Services per Day	Outpatient Care Services per Day	Emergency Pharmacy Services per Day	Percent
		Cost (USD)	Cost (USD)	Cost (USD)	
Personal cost	Salaries of Head of the outpatient pharmacy, Clinical Pharmacist, pharmacist, pharmacy technician, secretary, and porter	1526.68	931.27	595.41	65.35%
Overhead cost	Equipment's: Place, Computer, Laptop, iPad, Offices, Landline telephone, Mobile, Software of inquiries documentations, Printer, and fax, Copy machines, Answering machine, Small Refrigerator for medications, Medium Refrigerator for medications, Big Refrigerator for medications, Umber Cabinet for medications, Medications counter, Manager office, Chairs, Controlled medications cabinet, Medications shelves, Table for dispensing (Pinch), Bar-code printer, Pharmacy information system, the Metal partition between medications, Manual or electronic board, Boxes for losing tablets or capsules, Stapler, Staff personal cabinet, Temperature measurements machines, Humidity measurements machines, and Handwashing dish	695.39	424.19	271.2	29.77%
Material and Supply cost	The average cost of Regular files, Medications plastic bags, Pens, Masks, Gloves, Gowns, Shoes, Small size syringe, Medium size syringe, Big side syringe, Small size Ziploc plastic bag, Medium size Ziploc plastic bag, and Big size Ziploc plastic bag	68.78	41.96	26.82	2.94%
Non Salary cost	Education and Training Inpatient pharmacy resources	45.16	27.55	17.61	1.93%
Total USD		2336.01	1424.97	911.04	-
Total cost after discount 10%		2,102.41	1,282.47	819.94	-
Total cost after discount 20%		1,868.81	1,139.98	728.83	-

Table 6: Cost (USD) Analysis of Preparation and Dispensing at COMBINED Outpatient-Emergency pharmacy services.

Combined Outpatient and Emergency Pharmacy				
Medications	No Medications per day	Preparation and Dispensing Time per One Medication	Cost (USD) of Preparation and Dispensing per One Medication	Total Cost (USD) of Preparation and Dispensing per Day
Fast-moving item	29.38	6.25	10.13	297.47
Regular medications	28.44	6.63	10.74	305.46
Narcotics medications	10.63	9.81	15.89	168.93
Controlled medications	5.63	10.19	16.51	92.94
Average	18.52	8.22	13.31	216.2
Emergency Pharmacy				
Medications	No Medications per day	Preparation and Dispensing Time per One Medication	Cost (USD) of Preparation and Dispensing per One Medication	Total Cost (USD) of Preparation and Dispensing per Day
Fast-moving item	11.46	2.44	3.95	116.01
Regular medications	11.09	2.59	4.19	119.13
Narcotics medications	4.15	3.83	6.20	65.88
Controlled medications	2.20	3.97	6.44	36.25
Average	7.22	3.21	5.19	84.31
Outpatient Pharmacy				
-	No Medications per day	Preparation and Dispensing Time per One Medication	Cost (USD) of Preparation and Dispensing per One Medication	Total Cost (USD) of Preparation and Dispensing per Day
Fast-moving item	17.92	3.81	6.18	181.46
Regular medications	17.35	4.04	6.55	186.33
Narcotics medications	6.48	5.98	9.69	103.05
Controlled medications	3.43	6.22	10.07	56.69
Average	11.3	5.01	8.12	131.9

Table 7: Cost of some Outpatient and Emergency pharmacy activities.²³

	Time per one activity (Hrs.)	Time per one activity (Mintes)	Cost per one activity (USD)	Cost Per min (USD)
Drug Utilization Evaluation (DUE)	1.37	82.2	173.53	2.11
Deliver seminar and Presentation or Lecture	0.71	42.6	89.64	2.10
Pharm D student training	1.97	118.2	249.35	2.11
Residency Training	2.16	129.6	274.46	2.12
Respond to Drug Information Questions	4.23	253.8	536.24	2.11
Perform clinical research, publishing articles	1.03	61.8	130.81	2.12
ADR (Identification and Reporting)	0.62	37.2	78.17	2.10
Medications Errors preventing and monitoring	1.64	98.4	207.73	2.11
Patient Counseling	3.43	205.8	434.59	2.11
Ambulatory care clinic participation	0.84	50.4	106.94	2.12
Policies and Procedure design	2.33	139.8	295.64	2.11
Setting and evaluating therapeutic guidelines	1.68	100.8	212.56	2.11
CPR team participation	0.42	25.2	53.17	2.11
Pharmacokinetic consultation	0.76	45.6	97.00	2.13
Average	1.66	99.39	209.99	2.11

pharmacy and emergency model had been dispended, the actual patient waiting time would increase and equal to a previous study.¹⁶ In this study, the daily cost of the combined OPD and emergency pharmacy services model was high. To justify OPD and emergency pharmacy's high daily cost, we suggest providing various activities to the patients. Each activity's estimated cost was (2.11 USD) per minute, and the consumed time per activity was calculated to determine the reimbursement cost through health insurance coverage as addressed in (Table 7).²³ We also suggest switching all OPD and emergency pharmacy services dispensing medications with outsourcing services such as Saudi Managed Care Pharmacy called (Wasfaty) system.^{24,25}

Limitations

This study had some limitations. First, we included a small sample that might not have provided accurate results, and second, there was some information regarding cost analysis was not available to respondents something lead to leaving some questions without answers.

CONCLUSION

In conclusion, further research is highly warranted to monitor the cost of pharmacy services in the KSA. Therefore, the services delivered to the patients and the reimbursement cost must be specified for Saudi Managed Care Pharmacy (Wasfaty) in KSA.

ACKNOWLEDGEMENT

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

Funding

None

Consent for Publications

Informed consent was obtained from all the participants


Ethical Approval

The research ethics committee approved this study at Taif University.

ABBREVIATIONS

MOH: Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **ASHP:** American Society of Health-System Pharmacists; **SHPA:** Society of Hospital Pharmacists of Australia; **ISMP:** Institutions of the Safe Medications Practice; **OPD:** Outpatient Department Pharmacy; **ER:** Emergency; **DIC:** Drug Information Center; **USD:** United State Dollars; **CBAHI:** Saudi Central Board for Accreditation of Healthcare Institutions; **KFSH&RC:** King Faisal Specialist Hospital and research center; **KKUH:** King Khalid University Hospital; **RCH:** Riyadh Central Hospital; **MCH:** Maternity and Children's Hospital.

ORCID ID

Yousef Ahmed Alomi  <https://orcid.org/0000-0003-1381-628X>

REFERENCES

1. Alomi YA. A new Guidelines on Hospital Pharmacy Manpower in Saudi Arabia. *J Pharm Pract. Commun Med.* 2016;2(2).
2. Buxton JA, Babbitt R, Clegg CA, Durlay SF, Epplen KT, Marsden LM, *et al.* ASHP guidelines: Minimum standard for ambulatory care pharmacy practice. *Am J Health Syst Pharm.* 2015;72(14):1221-36. doi: 10.2146/sp150005, PMID 26150573.
3. Eppert HD, Reznick AJ, American Society of Health-System Pharmacists. ASHP guidelines on emergency medicine pharmacist services. *Am J Health Syst Pharm.* 2011;68(23):e81-95. doi: 10.2146/sp110020e. PMID 22095821.
4. Burrige N, Chow A, Cording A. SHPA standards of practice for hospital pharmacy outpatient services. *J Pharm Pract Res.* 2006;36(3):220-4. doi: 10.1002/j.2055-2335.2006.tb00613.x.
5. Welch S, Currey E, Doran E, Harding A, Roman C, Taylor S, *et al.* Standard of practice in emergency medicine for pharmacy services. *J Pharm Pract Res.* 2019;49(6):570-84. doi: 10.1002/jppr.1627.
6. Adams AJ, Hauser RB, Kayden C, *et al.* ISMP medication safety self Assessment@ for community/ambulatory pharmacy. Vol. 2017; 2017.
7. Institute for Safe Medication Practices. ISMP medication safety self assessment for hospitals. 2011;2011:1-4.
8. Ahmed Alomi Y. National Pharmacy Practice Programs at Ministry of Health in Saudi Arabia. *JPharm Pharm Scien*;1(2):17-8. doi: 10.24218/vjpps.2015.10.
9. Alomi YA. National medication safety program at Ministry of Health in Saudi Arabia. *J Pharmacovigil.* 2015;03(5):e145. doi: 10.4172/2329-6887.1000e145.
10. Pharmaceutical care services. King Faisal Specialist Hospital and Research Centre [internet] [cited Apr 8 2021]. Available from: <https://www.kfshrc.edu.sa/en/home/hospitals/riyadh/pharmaceuticalcareservices>.
11. Alsharfa A, Albassri H, Alonizi K, Alothaian M, Alreshidi M AT. National Drug Information Center Services through Ministry of Health Hotline Calling Center. YA1, Alomi, AL- Mudaiheem Saudi Arabia. *Adv Pharmacoepidemiol Drug Saf.* 2016;937:5(0):198.
12. YA A. National drug information center program at Ministry of Health in Saudi Arabia. *Adv Pharmacoepidemiol Drug Saf.* 2016;05(1):1-2. doi: 10.4172/2167-1052.1000e140.
13. Alomi YA, Alghamdi SJ, Alattyh RA. History and strategies of drug information services at Ministry of Health in Saudi Arabia. *PTB Reports.* 2019;5(1):1-3. doi: 10.5530/PTB.2019.5.1.
14. Alomi YA, Jamaan Alghamdi S, Abdullah Alattyh R, Shorog E, Alshahran A, Alasmay S, *et al.* National survey of pharmacy practice at MOH hospitals in Saudi Arabia 2016-2017: Preparation of medications and dispensing. *J Pharm*

- Pract. Commun Med. 2018;4(1s):s54-9.
15. Alomi YA, Shorog E, Alshahrani A, Alasmary S, Alenazi H, Almutairi A, *et al.* National survey of pharmacy practice at MOH hospitals in Saudi Arabia 2016-2017: drug monitoring and patients education. *J Pharm Pract. Commun Med.* 2018;4(1s):s17-22.
 16. Alomi YA, Al-Kammash HA, Alhamidi A, Aboziad W, Al-Hennawi KI, Al-Hennawi MMI, *et al.* Patient satisfaction of ambulatory care pharmacy services in Riyadh City, Saudi Arabia. *IJPCS.* 2019;8(1):32-8. doi: 10.5530/ijpcs.2019.8.7.
 17. Alomi YA, Alhadab M, Alotaibi T. Cost analysis of delivery adult medication therapy services at Ministry of Health in Saudi Arabia. *PTB Reports.* 2019;5(3s):S1-3. doi: 10.5530/PTB.2019.5.28.
 18. Alomi YA, Alhadab M, Alotaibi T, Alshammari AF, Alhaze N. Cost of pediatrics drug therapy services at Ministry of Health in Saudi Arabia. *PTB Reports.* 2019;5(3s):S9-S11. doi: 10.5530/PTB.2019.5.30.
 19. Alomi YA, Alhadab M, Alotaibi T, Alshammari AF, Alhaze N. Cost analysis of neonatal drug distribution services at Ministry of Health in Saudi Arabia. *PTB Reports.* 2019;5(3s):S17-9. doi: 10.5530/PTB.2019.5.32.
 20. Alomi YA, Fallatah AO, Qahtani AA AL, Al-Shubbar N, Al-Yahya MF, Al-Smail EH. Cost of Total Parenteral Nutrition Services at the Ministry of Health, Saudi Arabia. *Int J Pharm Heal Sci.* 2019;2(1):39-44.
 21. Alomi YA, Al-Jarallah SM. The cost analysis of network drug information services at Ministry of Health institutions in Saudi Arabia. *J Pharm Pract. Commun Med.* 2018;4(4):226-30.
 22. Alomi YA, Alsulami N, Qahtani NAI, Mashouf M, Qahtani A, Almansor FA. Cost analysis of drug information services at the mental hospital in Saudi Arabia. *J Pharm Pract. Commun Med.* 2018;4(2):83-6.
 23. Alomi YA, Aldosary BA. Cost Analysis of Activities for Network Drug Information Centers at the Ministry of Health Hospitals in Saudi Arabia. *IJPCS.* 2019;8(1):45-51. doi: 10.5530/ijpcs.2019.8.9.
 24. Alomi YA, Alghamdi SJ, Alattyh RA. Saudi managed care pharmacy (SMCP): New initiative system of MOH prescriptions dispensed through community pharmacies. *JPPCM.* 2017;3(3):145-53. doi: 10.5530/jppcm.2017.3.31.
 25. Aolola NAI, Aljudaib S, Behery F, Alwahaibi M, Alhawassi T. Perception of Saudi community towards the transition of pharmaceutical care services from the Ministry of Health Primary Healthcare Centers to the community pharmacies. *Res Sq.* 2020;12:1-20.