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RESEARCH ARTICLE

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# The Value of Clinical Pharmacist Consultation Visits at Ministry of Health Hospitals in Saudi Arabia: Intravenous Admixture Services and Pharmacy Total Quality Management

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Abstract

**Background:** The clinical pharmacist plays a significant role in the improvement of pharmacy services in Saudi Arabia. The objective of this study to explore the impact of clinical pharmacist consultation visit with emphasis on Intravenous Admixture services (IVDS) and pharmacy total quality management (PTQM) at Ministry of Health hospitals in Riyadh, Saudi Arabia. **Methods:** It is 12-months cohort study of a regular visit to three major public, pediatrics with maternity, and emergency hospital at Riyadh region. The assessment used based on Ministry of Health (MOH) pharmacy plan, Saudi hospital pharmacy standards, and the 6-points Likert assessment scale system before and end of the study periods. The total number of finished projects were sixteen projects divided between IVDS (nine projects) and PTQM (seven projects). **Result:** The improvements range changes in IVDS from 16.7% to 44.59% with average positive improvement 26.6%. In the PTQM the improvements range changes were16.7% to 100% with average positive changes was 69%. The highest score of the projects of IVDS was total parenteral nutrition standard formulation for adults and total parenteral nutrition standards formulation for pediatrics. Followed by total parenteral nutrition standards formulation for neonates. The highest score of the projects of PTQM was patient satisfaction program, an update of the medication errors reporting system, adverse drug reaction intervention system. Followed by an update of the patient counseling intervention notification system, and medication reconciliation intervention reporting system. **Conclusion:** The pharmacist showed clinical significance impact on the Intravenous services and pharmacy total quality management services in Riyadh region, Saudi Arabia. The contained consultation visit with quantity and quality manner with periodic assessment highly recommended for all hospitals.

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**Keywords:** Value, Clinical Pharmacist, Hospital Pharmacy, Ministry of Health, Saudi Arabia.

## INTRODUCTION

General Administration of Pharmaceutical cares launched in 2013 the updated very comprehensive strategic plan of Pharmaceutical care for all MOH institutions. It consisted of six strategic goals with the emphasis on best practice, medication safety, and Human Resources development.[1] In 2012, Al sultan and his colleagues did a survey of pharmacy practice in twenty hospitals with the low percentage of MOH hospitals, he found in the IV admixture practice (23-46%), clinical pharmacy (34.4%), and electronic prescriptions (28%).[2-3] Another study done by the author of a national survey of total parenteral nutrition (TPN), he found twenty-four only of MOH hospitals had TPN services, shortages of TPN devices requirements, and TPN safety requirements not existed at more than 50% of hospitals.[4-6] In the recent of national pharmacy practice for sixty MOH hospitals should very low percentages of pharmacy services. For instance, intravenous admixture does not exceed more than 32 % with only 9% had complete services, computerized physician order enter 14 %, and the residency program exists in around 4% of the MOH hospitals. [7-8] In a view to implement pharmacy strategic plan and improve pharmacy services the clinical pharmacist at our administrative need to practice at least 1-2 day per a week for hospital and visit the pharmacy to shares the experience, training and make consulting for the hospital pharmacy. In 2016, the first author position from general director of Pharmaceutical cares to the regular clinical pharmacist for consultation. The author started visit three hospitals at Riyadh city after approval of the general director of medical affairs and director of Pharmaceutical care in Riyadh Region. The impact of clinical pharmacist well established in Saudi Arabia with different specialties, drug information services, poisoning services, stewardship antimicrobial program, medication safety and preventing medication errors, Nutrition support pharmacy, anticoagulation program.[9-18] All previous literature measure the pharmacist impact with daily practice, visit the patients, making round or dispensing medication. Also, most of the studies investigated with special clinical pharmacy topic, the seldom found about Intravenous admixture or quality management. The author nor familiar with any study in Gulf countries or Middle East countries or overall the world to show the impact of weekly consultation visit of a clinical pharmacist or even the impact of pharmacist Intravenous admixture or pharmacy management. The goal of this study to explore the value of clinical pharmacist consultation visits at MOH hospitals in Saudi Arabia with emphasis on Intravenous admixture and Pharmacy Total Quality Management.

## METHOD

It is cohort study of 12-month to measure the value of clinical pharmacist consulting visit at three MOH major hospitals at Riyadh city in Saudi Arabia. The hospitals consisted of public, emergency, and pediatrics with maternity. They located at South, Middle, and North areas of Riyadh regions respectively. The public hospital was 272-bed capacity with adults, pediatrics and neonatal intensive care and emergency units. The hospital had medical, surgical, pediatric department and ambulatory care services and great diabetic center. The hospital accredited by International Joint Commission of Hospital Accreditation. The hospital has pharmacy services worked 24/7 and consisted of acute care pharmacy, ambulatory care pharmacy, and emergency pharmacy. The pharmacy services used computerized physician order entry and unit dose drug distribution system. The emergency hospital was 207 beds would expand to 500 bed in the nearest future. The hospital had adults, pediatric and neonatal emergency care and intensive care units. It had acute care with medical and surgical services and ambulatory care clinics and emphasis on endocrinology and cardiovascular diseases. The hospital had pharmacy services contained inpatient pharmacy, outpatient program, emergency pharmacy. The pharmacy has clinical services included drug information services, medical and surgical and critical care pharmacy services. The pharmacy has computerized physician order enter and unit dose drug distribution system. The pediatrics hospital is 280 bed serve pediatrics and maternity population. It had emergency services for pediatrics and maternity patient, ambulatory care clinics with different specialties in pediatrics, obstetrics, and Gynecology. It had acute services with medical and surgical units and critical care of neonates, pediatrics, and adults. The hospital has pharmacy services works 24/7 with unit drug distribution system and computerized physician order entry. The pharmacy consisted of inpatient pharmacy, outpatient pharmacy and emergency pharmacy services, drug information services, medication safety officer and very comprehensive pediatrics clinical compounding. The expert clinical pharmacist visited the three hospitals 3-4 days per a week. He pharmacist had a master degree in clinical pharmacy and board certified in pharmacotherapy and nutrition support. He had 25 experience in pharmacy practice, clinical pharmacy, and pharmacy administration, he was a past general manager of general administrative of pharmaceutical care at MOH, and he was coordinated

post graduate year one of the pharmacy practice residency program at several hospitals. The value measurement based on pharmacy plan of MOH hospitals, Saudi Center for hospital accreditation, and the 6-points Likert assessment scale system before and end of the study periods with a percentage of changes from baseline. The assessment scale system defined as follows; No activity to implement or not in plan in the future = 0, Discussed and plan but not implemented = 1, partially implemented 0-25% = 2, partially implemented 26-50% = 3. Partially implemented 51-75 % = 4, partially implemented 76-99 % = 5, fully implemented 100 % = 6, and Not Applicable = NA. In the study, the authors explore the Intravenous admixture and pharmacy quality management. The system protocol approved by previous General Administration of Pharmaceutical Care, Ministry of Health, Riyadh, Saudi Arabia.

## RESULTS

The number of pharmacy staff at three hospitals was 127, the total number of the pharmacist was 57 (44.9%) while the number pharmacy technicians were 70(55.1%). The demand for pharmacy staff was (96.8 FTE). The gender distribution female (34.65%) and the male were 83 (65.35%). The majority of pharmacy staff was Saudi. None of the pharmacy staff had a board of pharmaceutical specialties. All of three hospitals had all departments except repackaging, satellite pharmacy, and the extemporaneous preparation area. All three hospitals accredited by CBAHI and JCI. None of them accredited by Saudi Commission of health specialties for any pharmacy programs as explored in Table 1. The total number of projects was nine and eight for the intravenous admixture services and pharmacy total quality management respectively. Most of the projects a newly establish started from scores (0) and without any baseline like IV drip physician order for adult, pediatrics, and neonates, TPN Standard formulation for Adults, pediatrics, and neonates. The scores of IVDS projects were in a range between (1-2.67) average score (1.66), while scores of PTQM projects were in a range between (1-6) mean score (3.875). The highest score projects of IVDS were TPN Standard formulation for Adults, TPN Standard formulation for pediatrics, TPN Standard formulation for neonates while the lowest projects were IV drip physician order for adults, IV drip physician order for pediatrics and IV drip physician order for neonates as explored in Table 2. The highest score projects of PTQM were Update of the medication errors intervention reporting system, Update of adverse drug reaction, Update of patient counseling intervention notification system while the lowest scores were Pain management indicators, total parenteral nutrition indicators, Intravenous admixture indicators as explored in Table 3.

## DISCUSSIONS

The general administration of Pharmaceutical care implemented pharmacy practice or clinical pharmacy projects according to American College of Clinical Pharmacy Guidelines.[19-20] A representative from GAPC with extensive period experience of pharmacy practice, pharmacy administration, and clinical pharmacy visited three great and major hospitals in Riyadh city. The expert clinical pharmacist visited the pharmacy services 1-2 day per week per each hospital, discussed with the director of the pharmacy all projects need to newly established or improvement. The expert clinical pharmacist discussed with concern supervisor or staff pharmacist to start the projects. The proposal was written and followed up the expert clinical pharmacist; some performance did other pharmacist or staff pharmacy. The final projects started by staff pharmacist or expert clinical pharmacist and any correction or consultation would answer and supervised by an expert clinical pharmacist.

Before one year, all hospital pharmacies had a defect with Intravenous admixture with only the public and pediatrics hospital prepared and dispensed Total parental nutrition (TPN) for adults, pediatrics, and neonates. Emergency hospital TPN not stated yet. After one year several newly established projects started and others update and improve them. The newly formed nine projects of IVDS look like what found with Alomi and his colleague's studies[19,21-22] and reach the same services what found by Alsaltan *et al*.[2] In the pharmacy total quality management, there were one projects newly established at all hospital pharmacies while three projects applied at one hospital only because it was requested by hospital total quality management while another hospital did not seek it. The new projects like patient satisfaction program, as found in Alomi *et al* studies.[23-24] While four projects with updated improvements project for an instant; an update of the medication errors intervention reporting system at all hospital pharmacies. There is a big difference between the projects with the highest level while others reached to lowest percentage level. The explanation of the big wide difference due to some hospital pharmacies had a real shortage of staff pharmacist, shortage or absent of clinical pharmacist, shortage of support personal for pharmacies like porters or secretaries. In addition to very high workload, lack of pharmacy space, and with difficult to start new pharmacy project. Furthermore, recently all

**Table1: Demographic information.**

| Gender | Public hospital | Number of shortage of staff | Pediatrics and Maternity Hospital | Number of shortage of staff | Emergency hospital | Number of shortage of staff | Board of Pharmaceutical Specialty | Public hospital | Pediatrics and Maternity Hospital | Emergency hospital |
|---|---|---|---|---|---|---|---|---|---|---|
| Male | 40 (83.3%) | | 16 (40%) | | 27 (68.4%) | | Board Certified Ambulatory Care Pharmacist (BCACP) | 0 | 0 | 0 |
| Female | 8 (16.7%) | | 24 (60%) | | 12 (31.6%) | | Board Certified Critical Care Pharmacist (BCCCP) | 0 | 0 | 0 |
| Total | 48 (100%) | 43.4 | 40 (100%) | 16 | 39 (100%) | 1.4 | Board Certified Nuclear Pharmacist (BCNP) | 0 | 0 | 0 |
| Nationality | | | | | | | Board Certified Nutrition Support Pharmacist (BCNSP) | 0 | 0 | 0 |
| Saudi | 40 (83.3%) | | 40 (100%) | | 38 (97.4%) | | Board Certified Oncology Pharmacist (BCOP) | 0 | 0 | 0 |
| **Table 1: Con** | | | | | | | | | | |
| Non- Saudi | 8 (16.7%) | | 0 (0%) | | 1 (2.5%) | | Board Certified Pediatric Pharmacy Specialist (BCPPS) | 0 | 0 | 0 |
| Total | 48 (100%) | | 40 | | 39 | | Board Certified Pharmacotherapy Specialists (BCPS) | 0 | 0 | 0 |
| Number of beds | | | | | | | Board Certified Psychiatric Pharmacist (BCPP) | 0 | 0 | 0 |
| 200-299 | 272 | | 280 | | 207 | | None | 48 | 40 | 39 |
| | | | | | | | The pharmacy practice areas | | | |
| The hospital accreditation | | | | | | | Inpatient Pharmacy | ✓ | ✓ | ✓ |
| CIBAHI | Yes | | Yes | | Yes | | Outpatient Pharmacy | ✓ | ✓ | ✓ |
| Joint Commotion USA | Yes | | Yes | | Yes | | Satellite Pharmacy | × | × | × |
| Canada | No | | No | | No | | Narcotics | ✓ | ✓ | ✓ |
| Saudi commission of health accreditation for pharmacy programs | No | | No | | No | | Extemporaneous Preparation | × | ✓ | × |
| Academic Qualification(s) of pharmacy staff: | | | | | | | Clinical Pharmacy | × | × | ✓ |
| Diploma Pharmacy | 37 | | 15 | | 20 | | Inventory Control | ✓ | ✓ | ✓ |
| Bsc. Pharm | 7 | | 25 | | 15 | | Drug Information | ✓ | ✓ | ✓ |
| M.S | 0 | | 1 | | 0 | | Emergency pharmacy | ✓ | ✓ | ✓ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Msc. Clinical Pharmacy | 0 | 0 | 0 | Medication safety | ✓ | ✓ | ✓ |
| Pharm.D. | 4 | 2 | 4 | Repacking | × | × | × |
| Ph.D | 0 | 0 | 0 | Pharmacy Education and Training | ✓ | ✓ | ✓ |
| MBA | 0 | 0 | 0 | Computerized Physician Order Entry (CPOE) | ✓ | ✓ | ✓ |
| Pharmacy Residency Two years (R2) | 0 | 0 | 0 | | | | |
| Pharmacy Residency one year (R1) | 0 | 0 | 0 | | | | |
| Fellowship | 0 | 0 | 0 | | | | |

**Table 2: Intravenous Admixture projects**

**Intravenous Admixture**

| No | Projects | Strategic Goals | CIBAHI standards | Public hospital | | | | Pediatrics hospitals | | | | Emergency Hospital | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Before | After | Update | New | Before | After | Update | New | Before | After | Update | New | Average score before | Average score before | changes |
| 1 | IV drip physician order for adults | Goal No. 1 Provide Complete Pharmaceutical Care with Safety and Best Practice | MM.5.1 MM.5.2 MM.5.3 MM.5.4 (ESR) MM.36 | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | 16.7 % |
| 2 | TPN Standard formulation for Adults | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 6 | × | ✓ | 0 | 2.67 | 44.59 % |
| 3 | An Electrolyte physician order for Adults | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 4 | × | ✓ | 0 | 2 | 22.2 % |
| 4 | IV drip physician order for Pediatrics | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | 16.7 % |
| 5 | TPN Standard formulation for Pediatrics | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 6 | × | ✓ | 0 | 2.67 | 44.59 % |
| 6 | An Electrolyte physician order for Pediatrics | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | 16.7 % |
| 7 | IV drip physician order for Neonates | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | 16.7 % |
| 8 | TPN Standard formulation for Neonates | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 6 | × | ✓ | 0 | 2.67 | 44.59 % |
| 9 | An Electrolyte physician order for Neonates | | | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | × | ✓ | 0 | 1 | 16.7 % |

**Table 3: Pharmacy total quality management projects**

| Pharmacy Quality Management | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No | Projects | Strategic Goals | CIBAHI standards | Public hospital | | | | Pediatrics hospitals | | | | Emergency Hospital | | | | | |
| | | | | Before | After | Update | New | Before | After | Update | New | Before | After | Update | New | Average score before | changes |
| 1 | Patient Satisfaction program | Goal No. 1 Provide Complete Pharmaceutical Care with Safety and Best Practice | MM.40 MM.41 (ESR) | 0 | 4 | × | ✓ | 0 | 4 | × | ✓ | 0 | 4 | × | ✓ | 0 | 66.8 % |
| 2 | Update of medication errors intervention reporting system | | | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 6 | ✓ | × | 0 | 100 % |
| 3 | Update of adverse drug reaction intervention reporting system | | | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 100 % |
| 4 | Update of patient counseling intervention reporting system | | | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 100 % |
| 5 | Update of medication reconciliation intervention reporting system | | | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 6 | × | ✓ | 0 | 100 % |
| 6 | Pain management indicators | | | 0 | 1 | × | ✓ | NA | NA | × | ✓ | NA | NA | × | ✓ | 0 | 16.7 % |
| 7 | TPN Indicators | | | 0 | 1 | × | ✓ | NA | NA | × | ✓ | NA | NA | × | ✓ | 0 | 16.7 % |
| 8 | IV admixture indicators | | | 0 | 1 | × | ✓ | NA | NA | × | ✓ | NA | NA | × | ✓ | 0 | 16.7 % |

hospital had a real shortage of medication and all of the staff busy to bring available of medication to the patients. In the other face, we had supportive hospital administrators, medical directors, directors of hospital pharmacies, pharmacy supervisors, and pharmacy staff during working period. The changes of previous barriers would expand and improve pharmacy performance and clinical pharmacy services at all hospital pharmacies.

## CONCLUSION

The clinical pharmacist's value with consultation visit is potential to implement new established of intravenous admixture services and pharmacy total quality management projects and improve pharmacy services at the type of hospitals in Riyadh city, Saudi Arabia.


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## CONFLICT OF INTEREST

None

## ABBREVIATION USED

**IVDS:** Intravenous Admixture services; **PTQM:** Pharmacy total quality management; **MOH:** Ministry of Health; **GAPC:** General Administration of Pharmaceutical Care; **TPN:** Total parental nutrition; **CBAHI:** Saudi Central Board of Accreditation for Heath Care Institutions; **JCI:** Joint Commission International.

## REFERENCES


1. Alomi YA, Alghamdi SJ, Alattyh RA. Strategic Plan of General Administration of Pharmaceutical Care at Ministry of Health in Saudi Arabia 2012–2022. J Pharm Pharm Scien. 2015;1(3):1-8.
2. Alsultan MS, Khurshid F, Mayet AY, Al-jedai AH. Hospital pharmacy practice in Saudi Arabia: Dispensing and administration in the Riyadh region. Saudi Pharmaceutical Journal. 2012;20(4):307-15.
3. Alsultan MS, Khurshid F, Salamah HJ, Mayet AY, Al-jedai AH. Hospital pharmacy practice in Saudi Arabia: Prescribing and transcribing in the Riyadh region. Saudi Pharmaceutical Journal. 2012;20(3):203-10.
4. Alomi YA, Ajudaibi SM, and Alghamdi SJ. National Survey of Total Parenteral Nutrition practice in Saudi Arabia: Prescribing and transcribing at MOH Hospitals. EC Nutrition.2016;4(1):795-803
5. Alomi YA, Ajudaibi SM. National Survey of Total Parenteral Nutrition practice in Saudi Arabia: Dispensing and administration at MOH Hospitals. EC Nutrition. 2016;3(6):748-756.
6. Alomi YA, Ajudaibi SM. National Survey of Total Parenteral Nutrition practice in Saudi Arabia: Drug Monitoring and Patient Education at MOH Hospitals. EC Nutrition.2016;4(1): 784-792

7. Alomi YA**,** Alghamdi SJ, Alattyh RA, *et al*. National survey of pharmacy practice at MOH hospitals 2016: pharmacy management and resources. Value in Health.2017;20(5): A1–383.
8. Alomi YA**,** Alghamdi SJ, Alattyh RA, *et al*. National survey of pharmacy practice at MOH hospitals 2016: Preparation of medication and dispensing. Value in Health. 2017;20(5): A1–383.
9. Makeen HA. Clinical Pharmacists as medication therapy experts in diabetic clinics in Saudi Arabia-not just a perception but a need. Saudi Pharmaceutical Journal. 2017 .
10. Bahmaid R, Mroueh M, Al-Otaibi F, *et al*. The Role of the Clinical Pharmacist in Multidisciplinary Heart Failure Clinic at Tertiary Care Hospital. Donnish J Med Med Sci. 2016;3(3):011-4.
11. Dib J, Mohammed K, Momattin H, Alshehri A. Implementation of pharmacist-managed anticoagulation clinic in a saudi arabian health center. Hospital pharmacy. 2014;49(3):260-8.
12. Al-Somai N, Al-Muhur M, Quteimat O, Hamzah N. The impact of clinical pharmacist and ID intervention in rationalization of antimicrobial use. Saudi Pharmaceutical Journal. 2014;22(6):516-21.
13. Alomi YA, El-Bahnasawi M, Elemam AI, Elgaili SH, Kamran M. Clinical and Economic Impact Of Pharmacist Intervention At Critical Care Of Private Hospital In Riydah, Saudi Arabia. Value in Health. 2016;19(7):A465.
14. Alomi YA, Fallatah AO. Cost Avoidance Of Pharmacist Running Pediatrics Total Parenteral Nutrition Services At Ministry Of Health In Saudi Arabia. Value in Health. 2016;19(7):A461.
15. Alomi, YA, *et al*. Cost-Efficiency of of National Drug Information Center through Ministry of Healh Hotline Calling Services (937) in Saudi Arabia: Application of a Mercian Model. Value in health: the journal of the International Society for Pharmacoeconomics and Outcomes Research. 2015;18(7):A735.
16. Alomi YA. Cost-Efficiency of Clinical Pharmacy Services at Ministry Of Health In Saudi Arabia Application Of American Model. Value in Health. 2016;19(7):A482-3.
17. Alomi YA, Fallatah AO, Al-Smail EH. Assessment of Clinical and Economic Outcomes of Pharmacist Intervention in Total Parenteral Nutrition Program In Saudi Arabia. Value in Health. 2016;19(7):A465.
18. Alomi YA, Almudaiheem HY. Clinical and Economic Outcomes of Pharmacist Intervention during Therapeutic Drug Monitoring Program In Saudi Arabia. Value in Health. 2016;19(7):A465-6.
19. Alomi YA, Zahran R. Self-Assessment of mass gathering (Hajj) pharmaceutical care program in Saudi Arabia. J Pharm Pract Community Med. 2016;2(4):137-43.
20. American College of Clinical Pharmacy. Standards of Practice for Clinical Pharmacists. Pharmacotherapy. 2014;34(8):794–7.
21. Alomi YA. National Intravenous (IV) Therapy Program at MOH in Saudi Arabia. EC Pharm Sci. 2016;2(3):307-11.
22. Alomi YA. National Total Parenteral Nutrition Program at MOH in Saudi Arabia. EC Nutrition.2015;3(5):697-9.
23. Alomi YA. National Pharmacy Administration Programs at Ministry of Health in Saudi Arabia. BAOJ Pharm Sci. 2015;1(009).
24. Alomi YA, Kurdy L, Aljarad Z, Basudan H, Almekwar B, *et al*. Patient satisfaction of pharmaceutical care of primary care centers at Ministry of Health in Saudi Arabia. J Pharm Pract Community Med. 2016;2(3):79-87.


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