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RESEARCH ARTICLE

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The Outcomes of Clinical Pharmacist Consultation Visits at Ministry of Health Hospitals in Saudi Arabia: Medication Safety and Pharmacy Research

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Abstract

Background: Saudi Center of Health care facilities accreditation launched the update stagnated of medication management and use for hospital pharmacy. The MOH pharmacy plan to accredit all hospital pharmacies and highly demand consultation visit. The clinical pharmacist required to visit hospitals to improve the services and get the accreditation. **Objective:** The goal of this study to explore the value of clinical pharmacist consultation visit with emphasis on medication safety (MS) and pharmacy research (PR) at Ministry of Health hospitals in Riyadh, Saudi Arabia. **Methods:** It is a twelve months cohort study of a regular visit to three major hospitals as public, pediatrics with maternity and emergency specialties at Riyadh region. The performance assessment used based on Saudi hospital pharmacy standards, MOH pharmacy strategic plan, and the 6-points Likert assessment scale system before the study and by the end of the study. **Results:** The total number of finished projects were twenty projects divided between ME (nine projects) and PR (eleven projects).The improvements range changes in ME from 16.7% to 100% with average positive improvement 37.04%. In the PR the improvements range changes were 33.3% to 100% with average positive changes was 39.4%.The highest score of the projects of ME was ISMP-assessment medication safety for hospitals and ISMP-assessment anticoagulation medication safety for hospitals. The maximum score of the projects of PR was the patient satisfaction of ambulatory pharmacy services at three hospitals. **Conclusion:** The pharmacist showed the practical high impact on the medication safety and pharmacy research in Riyadh city, Saudi Arabia. The quality and quantity consultation visit with regular evaluation is required for continuous to keep pharmacy improvement at all hospital.

Key words: Outcomes, Clinical Pharmacist, Hospital Pharmacy, Ministry of Health, Saudi Arabia.

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INTRODUCTION

In late 2015, the Saudi Center for Health Care accredited launched update quality management standards and accreditation process. Those standers required for all governmental and private sector; otherwise, it will allow them to practice. The updated guidelines contained Essential Safety Requirements (ESR); that is mean all health care organizations should apply those standards and if any department did not pass those elements then all the organization will not get the accreditation.[1] Also, the MOH pharmacy plan consisted of major six strategic goals, best practice, and medication safety among them including national medication safety program. It requirements from all pharmacy services of all MOH hospitals and primary care centers to implement the plan.[2-3] In the pharmacy practice,there was the poor performance of medication safety. For instance, anational survey of medicines safety conducted in 2012 the authors foundmedication safety committee at (28%) of surveyed hospitals, medications safety director only (9%), list look-alike sound-alike medications (33%), and concentrated electrolyte found on floor stock (60%). Also, the expert recommended increasing number of researches focusing on medication safety in Saudi Arabia in the qualitative study.[4-5]Another study showed the medication errors reporting non-adherence documentation of crucial elements.[6] Another study showed adverse drug reaction reporting (74%) and medication reconciliation (48.1%) of the hospitals, and recent study stated that medication errors identification and reporting found in (90%) and adverse drug reaction (72%).[7-8] The pharmacist had a significant role in medication safety preventing medication errors in public and pediatrics MOH hospitals. A study by author and his colleagues showed the pharmacist prevent more than three thousand errors with estimated cost avoidance 98,000 to 116,000 USD per year.[9-11] In Saudi study showed the pharmacist interested in the researches but the capabilities to perform scientific research did not exist, another study with therevision of Pharmaceutical research the authors concluded the pharmacy research need improvement in Saudi Arabia.[12-13] The authors are not familiar with similar studies conducted in Gulf and Middle East countries or even overall the world. The goal of the study to explore the value of clinical pharmacist consultation visit at three MOH hospitals in Riyadh city, with emphasis on medication safety and pharmacy research.

METHOD

It is cohort study of 12-month measurements the value of clinical pharmacist consulting visit to three MOH hospitals at Riyadh city in Saudi Arabia. The clinical pharmacist hadamaster degree in clinical pharmacy and board-certified of pharmacotherapy specialist and board-certified of nutrition support pharmacy. He had more than fifteen years' experience of pharmacy practice and more than a decade experiences in clinical pharmacy with emphasis on adult's critical care and nutrition support. He was the coordinator of postgraduate year one (PGY1) at several hospitals and accredited by Saudi Commission of Health Specialists. The clinical visited 3-4 days per a week three hospitals. The study conducted at major and popular hospitals in Riyadh region. One public hospital with 272 beds with planning to expand tothemedical city in the futures. The hospital serves adults, pediatrics, and neonatal patients in South Riyadh region. The hospital had medical, surgical, pediatrics, nephrology and endocrinology. It had ambulatory care clinics with diabetic centers, emergency section, adult's critical care, and neonatal intensive care units. The hospital had pharmacy services 24/7 with different units included inpatient pharmacy, outpatient pharmacy, emergency pharmacy, drug information center. The pharmacy disturbed the medication through unit dose system with computerized physician order entry. The second hospital was pediatrics and maternity with 280 beds located at North sector of Riyadh city. The hospital had adults, pediatrics, neonatal critical care units, emergency pediatrics and maternity, and inpatient, ambulatory care services with different specialties included medical pediatrics and surgical pediatrics, endocrinology pediatrics. It had pharmacy services all type of patients admitted or visited the hospital with emphasis to pediatrics pharmacy. The pharmacy consisted of inpatient pharmacy, outpatient pharmacy, emergency pharmacy, pediatrics clinical compounding, and medication safety officer. The pharmacy usedtheunit system drug distribution network with computerized physician order entry. The third hospital was and emergency located in Middle of Riyadh region and very crowded area. It contained 207 beds with adults, pediatrics, neonates critical care unit, emergency department for all type of population, ambulatory care clinic with the emphasis on endocrinology and cardiovascular diseases. The hospital had pharmacy services cover 24/7 and consisted of inpatient pharmacy, outpatient hospital, emergency pharmacy, medication safety and drug information services. The pharmacy used unit dose drug distribution system and computerized physician order entry. The pharmacy. It had clinical pharmacist cover adults intensive care, medical and surgical units. The expert clinical pharmacist consultation and performance used General Administration of Pharmaceutical care plan and Saudi Board of Health Institutions standard. In addition to the 6-points Likert assessment scale system before and end of the study and

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 medication safety and pharmacy research and publication. 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 hospitalswas 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 majority of pharmacy staff was Saudi. The gender distribution female (34.65%) and themalewere 83 (65.35%). None of the pharmacy staff had aboard of pharmaceutical specialties. All of three hospitals had all departments except repackaging departments, satellite pharmacies, and the extemporaneous preparation units. 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 eleven for the medication safety (MS) and pharmacy research (PR) respectively. All the projects filled the requirement of CBAHI standards and MOH pharmacy strategic plan. Most of the projects a newly establish started from scores (0) and without any baseline like medication reconciliation, ISMP-assessment medication safety for hospitals, and ISMP-assessment anticoagulation medication safety for hospitals. The scores of ME projects were in a range between (1-6) average score (2.22), while scores of PR projects were in a range between (2-6) mean score (2.36). The highest score projects of ME were medication reconciliation, ISMP-assessment medication safety for hospitals, and ISMP-assessment anticoagulation medication safety for hospitals while the lowest projects were prepared narrow therapeutic index medication (Vancomycin, Gentamicin) for pediatrics, and prepare narrow therapeutic index medication (Vancomycin, Gentamicin) for neonates as explored in

Table 1: 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
The gender										
Male	40 (83.3%)		16 (40%)		2 7 (68.4%)		Board Certified Ambulatory Care Pharmacist (BCACP)	0	0	0
Female	8(16.7%)		24 (60%)		1 2 (31.6%)		Board Certified Critical Care Pharmacist (BCCCP)	0	0	0
Total	48(100%)	43.4	40 (100%)	31	3 9 (100%)	22.4	Board Certified Nuclear Pharmacist (BCNP)	0	0	0
Nationality							Board Certified Nutrition Support Pharmacist (BCNSP)	0	0	0
Saudi	40 (83.3%)		40 (100%)		3 8 (97.4%)		Board Certified Oncology Pharmacist (BCOP)	0	0	0
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		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					
Other (please specify)	0		0		0					

Table 2. The highest score projects of PR were thepatient satisfaction of ambulatory care pharmacy services while the lowest scores were all the reaming researches as explored in Table 3.

DISCUSSION

The updated-2016 medication management from Saudi Center for health institutions accreditation launched in late 2015s. The new edition consisted of forty-one standard. Three of them MM 5, MM 6, MM 41 are essential safety requirements. All the hospitals should get final accreditation from CIBAHI based on MOH strategic plan. Also, it included of MOH pharmacy strategic plan. The administration formulated several committees for that central medication safety committee and central total quality management committee. The first author was ahead of all committees. After changed his position he started to implement this project by visiting three hospitals 3-4 days on a weekly basis. The expert clinical pharmacist discussed withthedirector of pharmacy, supervisors, and pharmacy staff to apply the requirements of accreditation including medication safety. The expert clinical pharmacist started with nine projects, some of them newly established for example ISMP-assessment of medication safety for ageneral hospital, and ISMP-assessment of anticoagulation safety for hospitals. Both projects already found with Alomi study.[3] Some oftheprojects already exist but the updated version finished, those projects already found in Alomi study.[14] The author started another field, which required for Saudi pharmacy practice residency program.[15] Also it part of pharmacy staff training for researches

Table 2: Medication Safety projects

				Public hospital				Pediatrics hospitals				Emergency Hospital						
No	**Projects**	**MOH Pharmacy Strategic Goals**	**CBAHI stand-ards**	**Before**	**After**	**Update**	**New**	**Before**	**After**	**Update**	**New**	**Before**	**After**	**Update**	**New**	**Average score before**	**Average score before**	**changes**
1	Update IV drip manual for adults	Goal No. 1 Provide Complete Pharma--ceutical 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	2	✓	✓	0	1.33	22.2%
2	Update IV drip manual for Pediatrics			0	1	✓	×	0	1	✓	×	0	1	✓	✓	0	1	16.7%
3	Update IV drip manual for Neonates			0	1	✓	×	0	1	✓	×	0	1	✓	✓	0	1	16.7%
4	Prepare narrow therapeutic index medication (Vancomycin, Gentamicin) for adults			0	1	×	×	0	1	×	✓	0	2	×	✓	0	1.33	22.2%
5	Prepare narrow therapeutic index medication (Vancomycin, Gentamicin) for pediatrics			0	1	×	×	0	1	×	✓	0	1	×	✓	0	1	16.7%
6	Prepare narrow therapeutic index medication (Vancomycin, Gentamicin) for neonates			0	1	×	×	0	1	×	✓	0	1	×	✓	0	1	16.7%
7	Medication reconciliation			0	2	×	×	0	1	×	✓	0	1	×	✓	0	1.33	22.2%
8	ISMP-Assessment Medication Safety for Hospitals			0	6	×	✓	0	6	×	✓	0	6	×	✓	0	6	100%
9	ISMP-Assessment Anticoagulation Medication Safety for Hospitals			0	6	×	✓	0	6	×	✓	0	6	×	✓	0	6	100%

Table 3: Pharmacy Research projects.

No	Projects	MOH Pharmacy Strategic Goals	CBAHI standards	Public hospital				Pediatrics hospitals				Emergency Hospital					
				Before	After	Update	New	Before	After	Update	New	Before	After	Update	New	Average score before	changes
1	Alomi Y, Fallatah A. and Al-Smail E. (2016). Assessment of Clinical And Economic Outcomes of Pharmacist Intervention In Total Parenteral Nutrition Program In Saudi Arabia. Value in Health, 19(7), p.A465.	Goal No. 2 Best Utilization Resources based on Pharmaco-economics and Health Economics Strategies.	MM.3.2	0	6	×	✓	0	0	×	×	0	0	×	×	0	2	33.33 %
2	Alomi Y, Fallatah A. and Al-Smail E. (2016). Workload Analysis of Parenteral Nutrition Services At Ministry of Health Hospital In Saudi Arabia. Value in Health, 19(7), p.A465.			0	6	×	✓	0	0	×	×	0	0	×	×	0	2	33.33 %
3	Alomi Y, Fallatah A. (2016). Cost Avoidance Of Pharmacist Running Pediatrics Total Parenteral Nutrition Services At Ministry Of Health In Saudi Arabia. Value in Health, Volume 19, Issue 7, A461.			0	6	×	✓	0	0	×	×	0	0	×	×	0	2	33.33 %
4	Alomi YA, *et al*. (2016). Cost Of Total Parenteral Nutrition Services At Ministry Of Health In Saudi Arabia. Value in Health, Volume 19, Issue 7, A458 - A459.			0	6	×	✓	0	0	×	×	0	0	×	×	0	2	33.33 %
5	Alomi YA, Al-Shubbar NA. (2016). Adherence To Medication Errors Reporting System At Public Hospital, Riyadh, Saudi Arabia. Value in Health, Volume 19, Issue 7, A466			0	6	✓	×	0	0	×	×	0	0	×	×	0	2	33.33 %
6	Alomi YA Al-ShubbarNA, Lubad NA. (2017).Economics outcomes of medication safety program at public hospital in Riyadh, Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383.			0	6	✓	×	0	0	×	×	0	0	×	×	0	2	33.33 %

7	AlomiYA, Alhadab M, Alotaibi T, Alassadi N, Alhaza N, Alzahrani S, Alghamdi E. (2017).Cost analysis of delivery adult medication therapy services at Ministry of Health hospital in Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383		0	0	✓	×	0	6	×	×	0	0	×	×	0	2	33.33 %
8	AlomiYA, Fallatah AO. (2017). Cost analysis and forecasting during (2016-2020) of total parenteral nutrition preparations in Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383.		0	6	✓	×	0	0	×	×	0	0	×	×	0	2	33.33 %
9	Alomi YA, Alhadab M, Alotaibi T, Alhaza N, Alassadi N, Alzahrani S, Alghamdi E . (2017).Cost of Pediatrics drug therapy services at Ministry of Health in Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383.		0	0	✓	×	0	6	×	×	0	0	×	×	0	2	33.33 %
10	Alomi YA, Al-Kammash HA, Alhamidi A, Aboziad W, Alhadab M, Alotaibi N, Al-Shubbar NA. (2017). Patients' satisfaction of ambulatory care pharmacy services in Riyadh city, Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383.		0	6	✓	×	0	6	×	×	0	6	×	×	0	6	100 %
11	Alomi YA, Fallatah AO. (2017). Economic outcomes of pharmacist-managed neonatal total parenteral nutrition services at Ministry of Health in Saudi Arabia. Value in Health, Vol. 20, Issue 5, A1–A383.		0	6	✓	×	0	0	×	×	0	0	×	×	0	2	33.33 %

and the data analysis. Furthermore, most of the hospital pharmacies need for medication safety projects and pharmacy quality management projects. This newly established project with high scores grade had finished and published in Internal Conferences of Pharmacoeconomics and Outcomes 2016-2017. The majority of researches explored the pharmacoeconomics projects and cost calculation analysis of pharmacy services which required for Saudi Arabia Vision 2030 and privatizations.[16-18] The authors had excellent support from hospitals directors, medical directors, pharmacy supervisors, and pharmacy staff. However, there are barriers delay the projects or some prevented compilations for the instant shortage of pharmacy staff, shortage of clinical pharmacist staff, and lack experience of pharmacy research. The expert clinical pharmacist should continue to visit the hospital and maybe expand the knowledge to other hospitals, which highly demand of the mentioned projects.

CONCLUSION

The weekly consultation visit of clinical pharmacist is necessary to accomplish hospital pharmacies for national accreditation through implemented medication safety guidelines and improve pharmacy research projects documentation system at different specialties hospitals in Riyadh city, Saudi Arabia

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CONFLICT OF INTEREST

None

ABBREVIATION USED

MS: Medication Safety Program, PR: Pharmacy Research, MOH: Ministry of Health, GAPC: General Administration of Pharmaceutical Care, ISMP: Institution Safe Medication Practice, CBAHI: Saudi Central Board of Accreditation for Heath Care Institutions.

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