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National Survey of Pharmacy Practice at MOH Hospitals in Saudi Arabia 2016-2017: Preparation of Medications and Dispensing

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Abstract

Purpose: To explore National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia 2016-2017: Preparation of medications and Dispensing. **Methods:** It is a 4-months cross-sectional National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia. The study consisted of two parts; the demographic information and the second part contained eighty-five questions divided into nine domains drove from American Society of Health-System Pharmacists (ASHP) and Saudi Pharmaceutical Society (SPS) survey, the international standard of Joint Commission of Hospital Accreditation. An electronic questionnaire was distributed to 185 directors of pharmacies at MOH hospitals. The study discussed and analyzed National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia 2016: Preparation of medications and Dispensing. All analysis is done through survey monkey system. **Results:** The survey was carried out in 185 hospitals, the rate of reply was 105 (56.75%). The pharmacy services were the drug distribution unit dose 36 (34.3%), repacking operation system 15 (14.3% %), an extemporaneous preparation 22 (21 %), and Intravenous admixture 8 (7.6%) only. The drug distribution by unit dose commonly not existed at the hospital less than 100 beds size 18 (17.14). The Intravenous admixture commonly found at 200-400 beds hospitals 6 (5.7%). The hospital home infusion therapy provided from six (5.7%) hospital pharmacies only. The most outpatient prescriptions dispensed to hospital employees 69 (65.7%) hospital clinic or patients discharged or emergency room 63 (60 %), general public 58 (55.2%), and home healthcare services 31 (29.5%). The most system founded to assure the accuracy of preparations and dispensing. One pharmacist check drug order before dispensing 48 (45.7%), and two pharmacists review high-risk drugs 28 (26.7%) at all type of hospitals bed size. **Conclusion:** The essential elements of pharmacy, the cost, and improve outcomes associated with drug therapy care of patients as a member of the multidisciplinary care team. [5,6,7] To Provide PC; pharmacists should supply the knowledge of clinical pharmacy and best skills.[7] In Saudi Arabia, PC practice is still improving. In a study of Al-Arifi et al. showed that practice was weak at MOH hospitals. Annual survey of pharmacy services with improving drug distribution system prevent drug-related problem and improve patient care at Hospitals in Saudi Arabia.

INTRODUCTION

Many years ago, pharmacists' role was modified from product orientation services to patient-centered services in many countries. In the late 1970s, in Saudi Arabia, health organizations made a formal decision towards patient-oriented pharmacy practice when the clinical pharmacy started in Saudi Arabia.[1] The practice of pharmacy transformed into a wide range of pharmaceutical care (PC).[2-4] The role of the pharmacist in pharmacy practice should be directed on continuity of care of the patients, reduce mortality rates, minimize the risks, decrease the costs, and improve the outcomes associated with drug therapy care of patients as a member of the multidisciplinary care team(5)(6)(7). To Provide PC; pharmacists should supply the knowledge of clinical pharmacy and best skills(7). In Saudi Arabia, PC practice is still improving. In a study of Al-Arifi et al. showed, that pharmacists have positive attitudes toward Pharmaceutical Care overall. Most of them provide the counseling of patients on their medications use, dose, and duration of therapy." However, they encountered some barriers that cause decrease in the pharmaceutical care such as access to medical records, designated closed counseling area, lacking time, inadequate staff and pharmacy layout, despite the willingness of pharmacists to the pharmaceutical care.[8] In another study that reinforced many common barriers that impede the broad application of pharmaceutical care include lack of sufficient technology and personnel, poor clinical knowledge and communication skills of personnel.[9] Also, Saudi Arabia continues to have a shortage of clinical pharmacists as a result of the high requirement of clinical pharmacy services.[10] In one study, the existence clinical pharmacists in patient care rounds and chart review activities associated with proper interventions and potential cost avoidance performed and recorded in intensive care unit.[11] The national surveys through American Society of Health-system pharmacist structured according to six elements of the medication process system that includes; prescribing, transcribing, dispensing, administration, monitoring, and patient

education. In assessing preparation of medications and dispensing practices, the current study described estimated trends in the inpatient medication distribution process, methods of medication preparation and dispensing, use of technology in medication distribution, preparation of compounded sterile preparations, process of medication administration, barcode technology usage, use of medication administration records (MARs), outsourcing of preparation activities, and process of double checking medication order with a positive attitude on developing of medication use process.[12] In Saudi Arabia, available studies assessing hospital pharmacy practice are still limited.[13] However, the study only conducted in Riyadh region and did not include MOH hospitals pharmacies. The authors are not familiar with an investigation in this field in Gulf or Middle East countries. The objective of this study is to explore the national survey of pharmacy practice with emphasis on preparation of medication and dispensing.

METHODS

It is a 4-months cross-sectional National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia. The study consisted of two parts; the demographic information and the second part contained eighty-five questions divided into eight domains drove from American Society of Health-System Pharmacists (ASHP) and Saudi Pharmaceutical Society (SPS) survey, the international standard of Joint Commission of Hospital Accreditation. In addition to the local standards of Saudi Center of healthcare accreditation.[12-19] The parts were pharmacy management and resources, prescribing and medication control, preparation of medications and dispensing, Computerized and pharmacy technology, clinical pharmacy services, drug monitoring and patient's education, Pharmacy inventory control and stock management, Pharmacy education and training. The 5-point Likert response scale system closed and ended questions used. An electronic questionnaire distributed to the 185 directors of pharmacies at MOH hospitals. The follow-up was taken by email and telephone after two weeks. All primary care centers, pharmacy administration at MOH or regions excluded from the study. The study discussed and analyzed National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia 2016: Preparation of medications and Dispensing. All analysis is done through survey monkey system.

RESULTS

The survey was carried out in 185 hospitals, the rate of reply, was 105 (56.75%). Of that 30.5% of (< 50 beds) hospitals, 20% of (50-99 beds) hospitals, 15.2% of (100-199 beds) hospitals, 18.1% of (200-299 beds) hospitals, 16.5% of (= or > 300 beds) hospitals were involved. OF those, fifty-one (48.57%) hospitals accredited by CIBAHI, 30 (28.57%) hospitals accredited by Saudi Commission of Health Specialties, and ten (9.52%)

Table1: Demographic responder qualifications information.

Nationality	Response N	Response %	No. of hospital Licensed Beds	Response N	Response %
Saudi	101	96.2%	< 50	32	30.5%
Non-Saudi	4	3.8%	50-99	21	20.0%
Answered question	105		100-199	16	15.2%
Skipped question	0		200-299	19	18.1%
Age	**Response N**	**Response %**	300-399	10	9.5%
18 - 40	99	94.29%	400-499	6	5.7%
40 - 56	5	4.76%	= or > 600	1	1.0%
65+	1	0.95%	Medical City	0	0.0%
Answered question	105		Answered question	105	
Skipped question	0		Skipped question	0	
Academic qualifications	**Response N**	**Response %**	**Board of Pharmaceutical Specialty**	**Response N**	**Response %**
Diploma Pharmacy	28	26.67%	Board Certified Ambulatory Care Pharmacist (BCACP)	1	1.0%
Bsc. Pharm	59	56.19%	Board Certified Critical Care Pharmacist (BCCCP)	1	1.0%
M.S	10	9.52%	Board Certified Nuclear Pharmacist (BCNP)	0	0.0%
Msc. Clinical Pharmacy	0	0.00%	Board Certified Nutrition Support Pharmacist (BCNSP)	0	0.0%
Pharm.D.	10	9.52%	Board Certified Oncology Pharmacist (BCOP)	0	0.0%
Ph.D	2	1.90%	Board Certified Pediatric Pharmacy Specialist (BCPPS)	0	0.0%
MBA	1	0.95%	Board Certified Pharmacotherapy Specialists (BCPS)	1	1.0%
Pharmacy Residency Two years (R1)	2	1.90%	Board Certified Psychiatric Pharmacist (BCPP)	0	0.0%
Pharmacy Residency one year (R2)	0	0.00%	Non	95	96.9%
Fellowship	1	0.95%	Answered question	98	
Other (please specify)	2	1.90%	Skipped question	7	
Answered question	105		Total number of patients covered by health insurance	Response N	Response %
Skipped question	0		Non	67	63.8%
The hospital accreditation	Response Count	Response Percent	< 25%	23	21.9%
CIBAHI	51	48.57%	25-49%	9	8.6%
Joint Commotion USA	10	9.52%	50-74%	1	1.0%
Canada	1	0.95%	75-100% of our patients.	5	4.8%
Saudi Council	30	28.57%	Answered question	105	
None	22	20.95%	Skipped question	0	

hospitals only accredited by Joint Commission. While twenty-two (20.95%) hospitals none accredited by any organizations and 67 (63.8%) noncovered patient by health insurance. The majority age of responders were in 18-40 years age group 99 (94.29%) while the nationalities were from Saudi 101(96.2%) and Non-Saudi 4 (3.8%). The most of the responders had BSc Pharm 59 (56.19%) and diploma of pharmacy 28 (26.67%) while 95 (96.9%) none certified of Board of Pharmaceutical Specialties. The most of the responders had pharmacy experiences 4-6 years (72.34%), while (40.00%) of responders had 1-3 years pharmacy administration, and (73.33%) had no experiences in clinical pharmacy as explored in Table 1, and Table 2. The pharmacy services were the drug distribution unit dose 36 (34.3%), repacking operation system 15 (14.3% %), an extemporaneous preparation 22 (21 %), and Intravenous admixture 8 (7.6%) only. The drug distribution by unit dose commonly not existed at the hospital less than 100 beds size 18 (17.14). The Intravenous admixture commonly found at 200-400 beds hospitals 6 (5.7%). The hospital home infusion therapy provided from six (5.7%) hospital pharmacies only as explored in Table 3, Table 4, Table 5, Table 6, and Table 7.The most products under pharmacy control were the "Stock" large-volume sterile fluids (dextrose or sodium chloride injections or irrigation solutions) 50 (47.62%), followed by General Anesthetics other than pressurized gases 18 (17.14%) and Premixed (by manufacturer) I.V. solutions 12 (11.43%) for all types of hospital bed size as explored in Table 8. The most outpatient prescriptions dispensed to hospital employees 69 (65.7%) hospital clinic or patients discharged or emergency room 63 (60 %), public 58 (55.2%), and home healthcare services 31 (29.5%). The most system founded to assure the accuracy of preparations and dispensing, one pharmacist checks drug order before dispensing 48 (45.7%), and two pharmacists review high-risk drugs 28 (26.7%) at all type of hospitals bed size as explored in Table 9 and Table 10.

DISCUSSION

Previously, job of pharmacist was preparation and dispensing of medications. Now duties of pharmacist have changed after the new concept of the pharmaceutical care.[3] However, despite the new concept of pharmacy care and utilization of new technology with automated preparation and dispensing, still pharmacy technicians and pharmacists are involved in those steps at many different counties overall the world. During the new updated pharmacy planning at MOH hospital pharmacies, there were

Table 2: The responder experiences information.

Years of experience	Pharmacy Practice	Percent	Clinical Pharmacy	Percent	Pharmacy Administration	Percent	Response N
0	2	13.33%	11	73.33%	2	13.33%	15
< 1 year	12	38.71%	8	25.81%	11	35.48%	31
1-3	23	57.50%	1	2.50%	16	40.00%	40
4-6	34	72.34%	1	2.13%	12	25.53%	47
> 6 years	43	84.31%	0	0.00%	8	15.69%	51
Answered question:105 and skipped question:0							

Table 3: Drug distribution Unit Dose.

	Hospital bed size									
Answer Options	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City	Response N	Response %
We have a unit dose system that meets this definition; it covers 90% or more of our beds.	10	2	3	11	5	4	1	0	36	34.3%
We have a unit dose system that meets this definition; it covers										
< 25% of our beds	3	1	0	2	0	0	0	0	6	5.7%
25-50% of our beds	2	3	1	1	1	0	0	0	8	7.6%
50-75% of our beds	2	1	3	1	1	0	0	0	8	7.6%
75-90% of our beds.	1	1	1	5	2	0	0	0	10	9.5%
We have a unit dose system, but it does not meet the stated definition.	5	2	1	1	0	1	1	0	11	10.5%
The unit does is more than 24 hours supply medication.	4	2	3	2	1	0	0	0	12	11.4%
A single unit package label does not contain all required information. (Nonproprietary and Proprietary name, dosage form, strength, particular note, expiration date, and lot number).	2	5	3	3	0	0	1	0	14	13.3%
Not any medication profiles kept on inpatient pharmacy.	3	1	0	0	0	0	1	0	5	4.8%
We do not have a unit dose system but have received administration's approval to convert to unit dose within the next 12 months.	1	0	3	0	0	0	0	0	4	3.8%
We do not have a unit dose system of any kind and have no plans for one.	9	9	2	0	0	0	0	0	20	19 %
Answered question:105 and skipped question:0										
A unit dose drug distribution system is one in which (1) Almost all drugs (including Injectable and oral liquids) are dispensed in unit dose packages (2) Ready to administer (3) not more than a 24-hour supply of doses is dispensed, and (4) a pharmacy medication profile is kept on inpatient. Read the five statements and check the one that most closely describes the drug distribution system										

Table 4: Repackaging Operation System

Answer Options	Hospital bed size								Response %	Response N
	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City		
We have Repackaging system that meets ASHP definition; it covers 90% or more of capsules, tablets, powder, oral solution, topical, injectable Medication either ready prepackaged.	3	1	2	6	2	1	0	0	15	14.3%
< 25% of medications	4	1	2	2	2	1	0	0	12	11.4%
25-50% of medications	1	2	0	3	1	1	0	0	8	7.6%
50-75% of medications	1	1	2	1	0	0	0	0	5	4.8%
75-90% of medications.	0	2	0	5	1	0	1	0	9	8.6%
We have Repackaging system, but it does not meet the stated definition	3	3	5	7	4	3	1	0	26	24.8%
We do not have a unit dose system of any kind and have no plans for one.	19	10	6	2	1	0	0	0	38	36.2%
Answered question:105 and skipped question:0										

Table 5: Intravenous Admixture Services activities.

Answer Options	Hospital bed size								Response N	Response %
	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City		
These activities include pharmacy preparation of I.V. products with additives, relabeling I.V. products without additives, and reconstituting and labeling I.V. antibiotic and other injections.	1	1	0	3	3	0	0	0	8	7.6%
Comprehensive, complete service: We prepare nearly all I.V. admixture products and solutions for almost all patients.	0	0	0	0	0	2	0	0	2	1.9%
Noncomprehensive, complete service: We prepare only certain I.V. admixture products (e.g., parenteral nutrition solutions or antineoplastic injections) for almost all patient-care units.	0	0	0	3	1	1	0	0	5	4.8%
Noncomprehensive, incomplete service: We prepare only certain I.V. admixture products (e.g., Parenteral nutrition solutions or antineoplastic injections) for only some patient-care areas (e.g., pediatrics unit or ICU/CCU).	0	0	0	2	1	1	0	0	4	3.8%
Comprehensive, incomplete service: We prepare nearly all I.V. admixture products but for only a few patient-care areas. In other words, we have a comprehensive I.V. admixture service, but it serves only part of our hospital.	1	0	2	1	0	0	0	0	4	3.8%
No I.V. admixture service: Our pharmacy prepares almost no. I.V. additives or solutions.	30	20	14	10	5	2	1	0	82	78.1%
Answered question:105 and skipped question:0										

Table 6: The Home Infusion Therapy services

Answer Options	Hospital bed size								Response N	Response %
	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City		
Yes	0	1	1	3	1	0	0	0	6	5.7%
No	32	19	14	15	9	6	1	0	96	91.4%
If Yes; The home Infusion provided by the hospital pharmacy (i.e. sterile compounding of drugs only)	0	0	0	0	0	0	0	0	0	0.0%
The Hospital-owned and operate program that separate from hospital pharmacy (i.e. either for profit or nonprofit)	0	0	0	0	0	0	0	0	0	0.0%
Preferred provider or contractual arrangement with offsite home infusion provider	0	0	0	1	0	0	0	0	1	1.0%
Home Infusion provided by the hospital pharmacy and include sterile compounding and other services (patient education, delivery, clinical assessment, on-call services, and insurance verification and billing)	0	1	0	0	1	0	0	0	2	1.9%
Hospital-affiliated infusion program that privately operated, and includes joint venture and partnership arrangement.	0	0	1	1	0	0	0	0	2	1.9%
Answered question:105 and skipped question:0										

Table 7: The Extemporaneous Operation System.

Answer Options	Hospital bed size								Response N	Response %
	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City		
We have Extemporaneous Operation System that's including policy and procedure, preparation manual, log book documentation, expiring date, storage, and handling, labeling; training and education, and it covers 90%.	5	1	2	6	3	4	1	0	22	21.0%
We have Extemporaneous operation system that meets; it covers										
< 25% of medications	3	0	1	5	1	0	0	0	10	9.5%
25-50% of medications	0	1	0	2	1	1	0	0	5	4.8%
50-75% of medications	0	0	0	0	1	0	0	0	1	1.0%
75-90% of medications.	0	1	1	0	0	0	0	0	2	1.9%
We have Extemporaneous operation system, but it does not meet the stated definition or not cover all type of formulation	2	1	3	6	1	0	0	0	13	12.4%
We do not have Extemporaneous Operation System of any kind and have no plans for one.	21	15	9	3	3	1	0	0	52	49.5%
Answered question:105 and skipped question:0										

Table 8: The following product is under the Control of Pharmacy.

No.	Answer Options	Hospital bed size								Response Count	Response Percent
		< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City		
1	"Stock" large-volume sterile fluids (dextrose or sodium chloride injections or irrigation solutions.	18	10	8	10	2	2	0	0	50	47.62%
2	Premixed (by manufacturer) I.V. solutions.	2	2	3	2	0	3	0	0	12	11.43%
3	Fluid-administration sets.	3	0	0	1	1	0	0	0	5	4.76%
4	Intravenous infusion pumps and controllers.	0	1	0	0	0	0	0	0	1	0.95%
5	General anesthetics other than pressurized gases.	6	2	3	3	4	0	0	0	18	17.14%
6	Radiopaque agents.	0	0	1	0	0	0	0	0	1	0.95%
7	Blood fractions or components such as albumin.	1	1	0	2	1	0	1	0	6	5.71%
8	Radiopharmaceuticals.	1	0	0	0	0	0	0	0	1	0.95%
9	Controlled medications	0	0	1	0	0	0	0	0	1	0.95%
10	All of previous	0	1	0	0	0	1	0	0	2	1.90%
11	None of previous	0	4	1	1	2	0	0	0	8	7.62%
Answered question:105 and skipped question:0											
"Control" means, at a minimum, ordering, and distribution of all such products used in the hospital.											

updated pharmacy Skelton and sections of pharmacy departments.[7,20] Strategic planning was involved in the stage of preparation and dispensing of medications. The investigator measured the actual practice of pharmacy department according to the American Society of Health-System Pharmacy definition and beat beast practice standards. The finding showed that drug distribution methods through unit dose system deficient compared to the study by Pedersen et al. and almost the same results compared to the local study Alsultan, MS et. al. The ideal unit dose system implemented in the USA and some local hospitals for more than thirty years, while at MOH hospitals just recently before several years. The unit dose system needs pharmacy staff and workforce, and the MOH has a shortage of staff and difficult to implement the services without enough workforce. Increasing the number of pharmacist and utilization of new technology, it will solve the problem. [12,13] The finding of repacking system founded with a lower percentage. That is one additional deficit of unit dose system the percentage half to unit dose system. The repacking system is required to complete ideal unit dose system and prevent medications errors. Most of the hospital pharmacies do not have the equipment for that, but recently with new technology, some hospitals stated to implement this. The results of extemporaneous preparation are low percentage. The extemporaneous preparations methodology not standardized at MOH hospitals ; each organization prepares the formulation with a different substance and compounding method. The authors has just started to unify all preparations and standardized the pharmacy laboratory equipment. Also, the MOH pharmacy and therapeutic committee tried to use ready use preparations. The results of intravenous admixture services including home therapy are meager as compared to what's reported by Pedersen, C et al. and Alsultan, MS et al., and that is related to absence of pharmacy strategic planning since many years back.[12,13] The pharmacy administration now established IV therapy program including IV regular medications, oncology medications and TPN adults and pediatrics. The

Table 9: Type of Ambulatory CareServices.											
No		Hospital bed size									
	Answer Options	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City	Response N	Response %
1	Prescription service to hospital employee	17	13	12	14	7	5	1	0	69	65.7%
2	Prescription service to hospital clinic or emergency room patients or to patients discharged.	15	10	14	11	7	5	1	0	63	60.0%
3	Prescription service to the public.	20	8	9	10	6	4	1	0	58	55.2%
4	Home-health – care services (home visits or preparation of solutions).	8	2	8	5	4	3	1	0	31	29.5%
5	Drug therapy monitoring and/or management.	4	1	4	3	0	1	0	0	13	12.4%
6	Formal patient-education programs (at least 60 minutes in length).	4	0	1	3	0	1	1	0	10	9.5%
7	Mail Services for sending medication to outpatient	2	1	0	0	0	0	0	0	3	2.9%
8	No outpatient services	5	4	1	2	0	0	0	0	12	11.4%
	Answered question:105 and skipped question:0										

Table 10: Methods used to assure accuracy of preparation and dispensing medication.										
	Hospital bed size									
Answer Options	< 50	50-99	100-199	200-299	300-399	400-499	= or > 600	Medical City	Response N	Response %
One Pharmacist checking of drug order before dispensing	16	8	6	9	4	5	0	0	48	45.7%
Two pharmacists check for high risk patients or drugs	5	4	5	7	5	1	1	0	28	26.7%
Using technician check other technician	3	2	2	0	0	0	0	0	7	6.7%
Using automated storage and dispensing devices linked to pharmacy computer	0	0	0	0	0	0	0	0	0	0.0%
Using Bar-coding System	0	0	0	1	0	0	0	0	1	1.0%
Using automated storage and dispensing devices linked to pharmacy computer	0	0	0	1	0	0	0	0	1	1.0%
We do not have checking system	8	7	3	1	1	0	0	0	20	19.0%
Answered question:105 and skipped question:0										

number of hospitals stated to increase by the implementation of TPN services as reported by Alomi YA et al. the national survey of TPN at MOH hospitals.[21] The pharmacy still used floor stick medication with bulk, and some IV fluid medications that related most of the hospitals do have Intravenous admixture services. The Ambulatory care services dispensed medication to hospital staff, hospitals clinics, and emergency department and the public patient. However, still some aspect of pharmaceutical care is not yet implemented due to the very high shortage of clinical pharmacy workforce at MOH hospitals. The most hospital pharmacy used one pharmacist for dispensing, and low percent used double pharmacist and utilization of new technology. The most hospital pharmacies had poor primary pharmacy services at MOH hospitals and unusually lower number of bed size. The survey of pharmacy services at MOH hospitals is first done and repeated every one or two years is highly recommended.

CONCLUSION

The minimum standard of hospital pharmacies at MOH hospitals are not fully implemented. Targeting to improve the intravenous services, repacking system, and home infusion therapy. The usage of clinical Pharmacy at ambulatory care is highly recommended. The national survey of pharmacy practice with emphasis on the preparation and dispensing at MOH hospitals at regular period is required.

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CONFLICT OF INTEREST

None

SOURCE OF SUPPORT

None

ABBREVIATION USED

KSA: Kingdom of Saudi Arabia, MOH: Ministry of Health.

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