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# National Survey of Pharmacy Practice at MOH Hospitals in Saudi Arabia 2016-2017: Pharmacy Inventory Control and Stock Management

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**Abstract**

**Objectives:** To explore the pharmacy inventory control and stock management at Ministry of Health (MOH) hospitals in Saudi Arabia. **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. 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, pharmacy total quality management and drug information services. The 5-point Likert response scale system with closed and ended questions were used. An electronic questionnaire was distributed to the one hundred eighty-five directors of pharmacies at MOH hospitals. The study discussed and analyzed National Survey of Pharmacy Practice at MOH hospitals in Saudi Arabia: pharmacy inventory control and stock management. **Results:** The survey questionnaire distributed to 185 hospitals, the rate of reply was 105 (56.75%) hospitals. The inventory control system was founded at 3.58 (71.6%) hospital pharmacies with highest located at hospital more than 600 beds and 200-299 bed size. The separate medication store was founded in 3.52 (70.4%) of hospital pharmacies with highest located at hospital 200-299 bed size. The complete computerized inventory management system founded at 20 (19%) hospital pharmacies while 53 (50.5%) there is computerized inventory management system. The average score of stock management system was 2.9 (57.92%) with the highest element was a policy and procedure on short expired medication items 3.85 (77.03%) while lowest elements was a Bar-coding system for inventory management system 1.54 (30.89%). The average score of follow-up report of stock management System was 3.22 (64.4%) with the highest report was Short Expired Items Report 3.8 (76%), and the lowest report was Reorder Point Report 2.72 (54.4%). The average score Stock Management System Medication availabilities were 1.83 (36.6%). The drug supply received from actual needing was 2.67 (53.4%), the medications borrowed from another hospital if it is not available in the pharmacy was 1.44 (28.8%) while the medications direct purchased to the hospital if it is not available in the pharmacy was 1.39 (27.8%). **Conclusion:** In hospital pharmacies, there was poor implementation of inventory management system. The full review of the drug stock management system with close monitoring is highly recommended to keep all medication available all the time, prevent under or overstock medications, and prevent all drug demand related problems.

**Key word:** Pharmacy inventory control, Stock management, Ministry of health, Saudi arabia.

## INTRODUCTION

The pharmaceutical care was considered as the primary role of the pharmacist.[1] The concept consisted of several steps starting from bringing medication to follow up of patient until reach optimal clinical and economic outcomes.[2] The pharmacy store as part of the skeleton of hospital pharmacy is responsible for bringing the medications and keep all the medications at available over 24/7 at hospitals with close monitoring of medications consumption.[3] Several studies showed the potential impact of shortages of medications on the patient and health economic burden.[4-6] Despite that, still there is shortage of medication at outside and inside Saudi Arabia.[7-9] Several studies conducted to measure the actual situation of the pharmacy inventory management system of medications at hospital pharmacies.[10-12] Also, the famous studies of pharmacy practice through American Society of Health-system pharmacist did not cover pharmacy stock management very well.[13-16] Also, few local studies investigated the pharmacy practice in Kindom of Saudi Arabia without discussion of the pharmacy stock management system. It very hard to find the inventory management of medications system studies in Saudi Arabia or Gulf and Middle East

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counties.[17-19] The objective of the study to explore the national survey of pharmacy practice with emphasis on pharmacy inventory control and stock management services at Ministry of Health hospital in Kingdom of Saudi Arabia.

## 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.[13,15,17-21] 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, pharmacy total quality management and drug information services. The 5-point Likert response scale system was used with closed and ended questions. An electronic questionnaire distributed to the one hundred eighty-five directors of pharmacies at MOH hospitals. The follow-up was taken through email and telephone at every one-two week. 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: pharmacy inventory control and stock management. All analysis is done through survey monkey system.

## RESULTS

The survey questionnaire was distributed to 185 of hospitals, the rate of reply, was 105 (56.75%) hospitals**.** Of that 30.5% of (< 50 beds) hospitals, 20.0% 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. 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%) hospitals only accredited by Joint Commission. While twenty-two (20.95%) hospitals were not accredited by any organizations and 67 (63.8%) patients were not covered by any health insurance. The majority age of responders was (18-40) years 99 (94.29%) while the nationalities were Saudi 101(96.2%) and Non-Saudi 4 (3.8%). 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. Most of the responders had pharmacy experiences 4-6 years (72.34%), while (40.00%) of responders had 1-3 years pharmacy administration experience, and (73.33%) had no experiences in clinical pharmacy as explored in Table 1, and Table 2. The inventory control system was founded at 3.58 (71.6%) hospital pharmacies

**Table 1: 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 N | Response % | < 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 | |

| 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: The hospital pharmacy inventory control system. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Hospital bed size** | | | | | | | | | |
| **Answer Options** | **< 50** | **50-99** | **100-199** | **200-299** | **300-399** | **400-499** | **= or > 600** | **Medical City** | **Rating Average** | **Response N** |
| Do you have an Inventory Control system? | 3.55 | 2.85 | 3.67 | 4.74 | 3.40 | 2.33 | 5.00 | 0.00 | 3.58 | 102 |
| Do you have a separate drug store in the pharmacy? | 3.35 | 3.52 | 3.25 | 4.06 | 3.70 | 3.67 | 1.00 | 0.00 | 3.52 | 103 |
| Do you have statistical data about annual consumption for all medications? | 3.91 | 3.65 | 4.00 | 4.56 | 3.70 | 4.33 | 1.00 | 0.00 | 3.96 | 103 |
| **If Yes how do you calculate annual consumptions:** | | | | | | | | | | |
| | | | | | | | | | **Percent Count** | **Response Count** |
| By collecting the previous consumption data. | 13 | 10 | 8 | 9 | 4 | 3 | 0 | 0 | 47.47% | 47 |
| Roughly Assumption. | 2 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 9.09% | 9 |
| By using inventory Computer system. | 13 | 6 | 7 | 9 | 5 | 1 | 0 | 0 | 41.41% | 41 |
| Manually | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.01% | 1 |
| Medical supply information | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.01% | 1 |
| Other (please specify) | 4 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | | |
| Answered question:96 and skipped question: 6 | | | | | | | | | | |
| **Type of computerized system of pharmacy inventory management (procurement, dispensing, recalling, follow-up old and new stock items, inventory reports)** | | | | | | | | | | |
| We have complete computerized inventory management system | 6 | 4 | 3 | 5 | 1 | 0 | 1 | 0 | 19.0% | 20 |
| We have partial computerized inventory management system | 8 | 6 | 2 | 9 | 3 | 4 | 0 | 0 | 30.5% | 32 |
| No, we do not have computerized inventory management system | 18 | 11 | 11 | 5 | 6 | 2 | 0 | 0 | 50.5% | 53 |
| Answered question:105 and skipped question: 0 | | | | | | | | | | |

with highest located at hospital more than 600 beds and 200-299 bed size. The separate medication store was founded in 3.52 (70.4%) hospital pharmacies with highest located at hospital 200-299 bed size. The statistical data about annual consumption of all medications was founded at 3.52 (79.2%) of hospital pharmacies highest located at hospital 200-299 bed size, and bed size 100-199. The most method of annual consumption calculated by the previous consumption data 47 (47.47%) and inventory Computer system 41 (41.41%). The complete computerized inventory management system founded at 20 (19%) hospital pharmacies while 53 (50.5%) there is computerized inventory management system as explored in Table 3. The average score of stock management system was 2.9 (57.92%) with the highest element was a policy and procedure on short expired medication Items 3.85 (77.03%) while lowest elements was a Bar-coding system for inventory management system 1.54 (30.89%). The average score of follow-up report of stock management System was 3.22 (64.4%) with the highest report was Short Expired Items Report 3.8 (76%), and the lowest report was Reorder Point Report 2.72 (54.4%) as explored in Table 4 and Table 5. The average score Stock Management System Medication availabilities were 1.83 (36.6%). The drug supply received from actual needing was 2.67 (53.4%), the medications borrowed from another hospital if it is not available in the pharmacy was 1.44 (28.8%) while the medications direct purchased to the hospital if it is not available in the pharmacy was 1.39 (27.8%). The Number of Non-Formulary Drug requisition annually was 58 (55.2%) with less than 25 drugs annually, and there is non-formulary drug requisition was 32 (30.5%) as explored in Table 6 and Table 7.

## DISCUSSION

The pharmacy administration at MOH expanded hundreds of medications at MOH drug formulary with the cooperation of medical supply and logistics administration.[22] Both administrations were members of MOH corporate of

**Table 4: Stock Management System elements.**

| Answer Options | Always | Often | Sometimes | Rarely | Never | Rating Average | Percent Average | Response N |
|---|---|---|---|---|---|---|---|---|
| Does hospital pharmacy has Bar-coding system for inventory management system? | 9 | 1 | 5 | 6 | 80 | 1.54 | 30.89 | 101 |
| Does hospital pharmacy has a policy and procedure on Short Expired Medication Items | 52 | 17 | 12 | 5 | 15 | 3.85 | 77.03 | 101 |
| Does hospital pharmacy has a system of Expired Return Medications to the company | 29 | 12 | 10 | 7 | 44 | 2.75 | 55.10 | 102 |
| Does hospital pharmacy has system of wasting Expired Medications or unused medication, empty vial or bag, traces quantities of chemotherapy | 32 | 14 | 11 | 11 | 35 | 2.97 | 59.42 | 103 |
| Does hospital pharmacy has complete supply of the drugs | 25 | 25 | 28 | 12 | 13 | 3.36 | 67.18 | 103 |
| Answered question:105 and skipped question: 0 | | | | | | | | |

**Table 5: Type of monthly follow-up report of stock management System.**

| | Hospital bed size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Answer Options | < 50 | 50-99 | 100-199 | 200-299 | 300-399 | 400-499 | = or > 600 | Medical City | Rating Average | Response Count |
| Fast Moving Item Report | 3.06 | 2.95 | 3.38 | 3.79 | 3.40 | 2.67 | 1.00 | 0.00 | 3.21 | 103 |
| Slow Moving items Report | 3.16 | 2.85 | 2.93 | 4.00 | 3.40 | 2.67 | 1.00 | 0.00 | 3.19 | 101 |
| Fast Growth Report | 2.87 | 2.39 | 2.73 | 3.33 | 2.78 | 2.20 | 1.00 | 0.00 | 2.78 | 97 |
| Slow Growth Items Report | 3.03 | 2.44 | 2.21 | 3.22 | 2.78 | 2.20 | 1.00 | 0.00 | 2.74 | 94 |
| Short Expired Items Report | 3.91 | 3.63 | 3.38 | 4.28 | 3.70 | 4.17 | 1.00 | 0.00 | 3.80 | 102 |
| Re order point Report | 2.64 | 2.79 | 2.80 | 3.24 | 2.43 | 1.60 | 1.00 | 0.00 | 2.72 | 92 |
| Nonmoving items Report | 3.50 | 2.78 | 3.20 | 3.24 | 3.00 | 3.60 | 1.00 | 0.00 | 3.20 | 93 |
| Non Available Medications from the Supplier Report | 3.63 | 3.17 | 3.25 | 4.22 | 3.78 | 4.00 | 1.00 | 0.00 | 3.60 | 97 |
| Non Available Medications in the Pharmacy Report | 3.61 | 3.40 | 3.75 | 4.17 | 3.89 | 4.83 | 1.00 | 0.00 | 3.76 | 101 |
| answered question | | | | | | | | | | 105 |
| skipped question | | | | | | | | | | 0 |

**Table 6: Stock Management System Medication availabilities.**

| | Hospital bed size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Answer Options | < 50 | 50-99 | 100-199 | 200-299 | 300-399 | 400-499 | = or > 600 | Medical City | Rating Average | Response N |
| If No What is the percentage drug supply received actual needing | | | | | | | | | | |
| < 25% | 2 | 8 | 1 | 3 | 3 | 0 | 0 | 0 | | |
| 25-49% | 7 | 2 | 0 | 7 | 2 | 4 | 1 | 0 | | |
| 50-74 % | 12 | 7 | 10 | 5 | 4 | 2 | 0 | 0 | | |
| 75-100 % | 11 | 4 | 3 | 4 | 1 | 0 | 0 | 0 | | |
| | 3.00 | 2.33 | 3.07 | 2.53 | 2.30 | 2.33 | 2.00 | 0.00 | 2.67 | 103 |
| What is the percentage of medications borrowed from another hospital if it is not available in the pharmacy | | | | | | | | | | |
| < 25% | 23 | 15 | 11 | 7 | 6 | 4 | 0 | 0 | | |
| 25-49% | 4 | 3 | 3 | 7 | 2 | 2 | 1 | 0 | | |
| 50-74 % | 3 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | | |
| 75-100 % | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | | |
| | 1.42 | 1.17 | 1.44 | 1.67 | 1.70 | 1.33 | 2.00 | 0.00 | 1.44 | 97 |
| What is the percentage of medications direct purchased to hospital if it is not available at the pharmacy | | | | | | | | | | |
| < 25% | 19 | 15 | 13 | 11 | 8 | 5 | 1 | 0 | | |
| 25-49% | 3 | 3 | 0 | 3 | 1 | 1 | 0 | 0 | | |
| 50-74 % | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | | |
| 75-100 % | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | | |
| | 1.59 | 1.17 | 1.33 | 1.50 | 1.30 | 1.17 | 1.00 | 0.00 | 1.39 | 93 |

**Table 7: Number of Non-Formulary Drug requisition annually.**

| | Hospital bed size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Answer Options** | **< 50** | **50-99** | **100-199** | **200-299** | **300-399** | **400-499** | **= or > 600** | **Medical City** | **Response N** | **Response %** |
| < 25 | 11 | 11 | 8 | 16 | 6 | 5 | 1 | 0 | 58 | 55.2% |
| 25-49 | 4 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 9 | 8.6% |
| 50-74 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 1.9% |
| 75-100 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 4 | 3.8% |
| We do not have it | 16 | 8 | 6 | 0 | 2 | 0 | 0 | 0 | 32 | 30.5% |

Pharmacy and Therapeutic committee. In annual basis, the medical supply and logistic administration review the MOH medication to include in the group tender budget with Gulf counties group purchasing. The quality and quantity of medication based on information from the pharmacy and therapeutics committee and annual consumption from hospital pharmacies. The medical supply and logistics administration had a computerized system for inventory control of medication. However, the system was not fully implemented to all hospitals. The pharmacy administration formulated task force committee to establish a system for inventory control of medications. The team consisted of several expert members from different regions. The first draft released then reviewed by an external reviewer. After six months of very comprehensive work, the pharmacy administration released the first system of inventory management control of medications for hospital pharmacies at MOH hospitals. It was full detail starting from requesting medication until annual budget and method of monitoring medications consumption. The authors investigated in this study through a national survey of hospital pharmacy the pharmacy inventory control and stock management. The finding showed good percentages of applied inventory control system of medication at the hospital pharmacy, with separated pharmacy store, and had annual consumption of medications. In additions, the pharmacy had annual consumption calculated by previous data and usage of inventory computer system. However, The finding of stock management system elements was almost fifty percent with an emphasis on pharmacy not used the bar-coding system at most of the hospitals, a system of Expired Return Medications to the company not implemented, and the complete supply of the drugs not founded at more third of hospitals. The results of using barcoding system at stock management was same as what reported by Frontini R *et al*.[11] Moreover, the computerized complete inventory management system not existed at more than eighty percent of hospital pharmacies, monthly report for follow up of stock control management was not adequate for instant fast or slow growth report and reorder point request of medications because most of the hospitals missed full computerized pharmacy inventory management system. The report of expired medications or shortage drugs founded in the report by Monton C *et al*., but other reports are not mentioned in the study.[12] Also, the actual need for medication not received about half of the responders and without bowered medication or direct purchasing existed. That is excepted because there is no regulation at MOH, regardless the medications were regular or an emergency one. Another result of study is difficult to compare with previous investigations because this maybe the first study with details of pharmacy inventory management system in Saudi Arabia, Gulf and Middle East counties. The discrepancy in the results and challenges of pharmacy inventory stock management due to the absence of full regulations and policy and procedures at all MOH hospitals.

## CONCLUSION

The pharmacy inventory management system at MOH hospital is not fully implemented. The full revision with update of the actual system is a required to prevent the economic burden on healthcare system with excellent patient clinical outcomes in Kingdom of Saudi Arabia.

## ACKNOWLEDGEMENT

None

## CONFLICT OF INTEREST

None

## SOURCE OF SUPPORT

None

## ABBREVIATION USED

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

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