

Hospitals Pharmacy Quality Assurance System Assessment in Tehran University of Medical Sciences, Iran

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Abstract

Background: Health system pharmacies, like other health care professional, practice under a number of mandated standards. Basic concepts of quality assurance (QA) standards should be applied to hospital pharmacy practice. The survey reported here is to assess QA system implementation and its standard indicators observation in Tehran University of Medical Sciences (TUMS) hospitals' pharmacies in 2007 – 2008.

Methods: A cross – sectional, descriptive analytical survey was accomplished. First, a checklist within the framework of QA standard indicators was made to assess TUMS hospitals pharmacies practice. Collected data was saved by Excel software for recording and analyzed by SPSS version-15. Observation rate of QA standard indicators was classified by inappropriate, relatively appropriate, and appropriate.

Results: Characteristics of TUMS hospitals pharmacists organizational structure, size, equipment, safety facility and drug requirement were studied by QA standard indicators.

Conclusion: Many of QA standard indicators are observed and implemented in TUMS hospitals pharmacies, but several of these standards are not observed too. It is appropriate that all TUMS hospitals pharmacies are required to advance the profession, often with the same goal of increasing involvement in direct patient care.

Keywords: Hospital Pharmacy, Quality Assurance, Standard, Assessment, Iran

Introduction

Hospital Pharmacy Services are designed to meet the primary needs of all customers. Pharmacy services include dispensing of pharmaceuticals in accordance with country regulations, appropriate inventory maintenance functions, drug monitoring, patient drug assessment functions, appropriate record keeping, drug information, education services, and performance improvement functions. (1).

A cornerstone of principle's strategy is to implement vigorous management programs to ensure measurable operating results through the continuous maintenance and improvement of quality initiatives. Hospital pharmacy should not take a retrospective approach; instead, it is a concurrent series of measures, which is taken to make certain principle's standards for best practices (2).

“Dolores” and “Vermeulen” provided a basis identifying opportunities for growth and development, as well as for international collaboration, to ad-

vance the profession of pharmacy and ensure that patients worldwide receive the care that they deserve (3).

National standards of good pharmacy should be specified and adhered to by practitioners. Specific standards of good pharmacy practice can be developed only within the framework of a national organization. These guidelines are recommended as a set of professional goals in the interest of the patients or customers (4, 5).

A practice standard is a statement that defines the performance expectations, structures, or processes that must be in place for an organization to provide safe and high quality care, treatment, and services. “Health system pharmacists, like other health care professionals, practice under a number of mandated standards” (6, 7).

“Tyler's and Nickman” evaluated the extent to which institutional pharmacies comply with the accreditation standards of Joint Commission on

the Accreditation of Health Care Organizations (JCAHO) and American Society of Health-System Pharmacists (ASHP) guidelines for reporting adverse drug reactions (ADRs) in USA. The results showed that sixty-seven percent of the respondents indicated that they did not have a formal ADR committee for monitoring and evaluating ADRs (8, 9).

Basic concepts of quality assurance (QA) should be applied to hospital pharmacy practice. The terms norm, criteria, standard, structure assessment, process assessment, and outcome assessment are elements of QA. There is interrelationship among the mentioned elements (10).

At the pharmacy services of the Hospital de Barcelona, quality indicators were designed based on standard values, which were compared against real values obtained in the course of pharmacy activities. The results revealed that some of the most recently incorporated standards did not reach the value established in the initial evaluation. Corrective measures were necessary, and these led to improved performance in subsequent evaluations (11).

“Angaran” announced that a general hospital with 90 beds was closed because of an inability to provide pharmaceutical care and to attract qualified pharmacists in USA (12).

“Baqir” explained that pharmacy jobs have been redesigned so that audit and research are now core functions for pharmacists and technicians working at the department (13).

The survey reported here is aimed to assess QA system implementation and its standard indicators observation in Tehran University of Medical Sciences (TUMS) hospitals pharmacies in 2007-2008.

Materials and Methods

A cross-sectional, descriptive survey was accomplished. First, a checklist including 72 questions within the framework of QA standard indicators published by International Pharmaceutical Federation, Accreditation Council for Pharmacy, California Board of Pharmacy, New Mexico Board of Pharmacy, Australian Pharmacy Council, Royal Pharmaceutical Society of Great Britain, American

Society of Health-Society Pharmacists (ASHP) and Joint Commission On Accreditation of Health Care Organization (JCAHO) requirement series was made to assess organizational structure, size, location, equipment, safety, facility and regulations of TUMS hospitals pharmacies. QA standard indicators could measure the quality of total TUMS hospitals pharmacies practice and reflect their services and activities. It is a set of jointly agreed internal procedures to assess the QA of all TUMS hospitals pharmacies.

The data was saved by Excel software and analyzed by SPSS version -15. Observation rate of QA standard indicators was classified by inappropriate < 50%, relatively appropriate: 50-75% and appropriate > 50%

Results

Just as mentioned at Table 1, all of studied hospital pharmacies had organizational chart. All of hospitals pharmacists in charge had a formal communication with the hospital administrators and had skillful and knowledgeable staffs to dispense drug to patients. The drug committee was established in all of the hospitals and all of the pharmacy directors participated in this committee regularly. However, the majority of hospitals pharmacies did not provide a round clock services and less than 50% of them had a satellite unit in outpatient or emergency department.

Table 2 shows all of hospitals pharmacies had drug storage and were inspected periodically by legal authorities to observe clean, well-lighted and well ventilated areas and drug prescriptions. All of them had a refrigerator for storage of decaying medications and had appropriate safety equipments and facilities and light sensitive drugs stored appropriately, but in less than 30% of them proper equipments for preparation of dermal sterile drugs and medications were present.

As Table 3 shows, in all of the hospital pharmacies, the necessary and emergency drugs and medical equipments of inpatients and operating rooms were dispensed timely, the pharmacist could communicate with the physicians about ordered

medication if it is needed, the drugs were delivered to hospital wards according to written orders of physicians or qualified nurses. In addition, there is a precaution for storage of narcotic drugs and the pharmacists controlled the store for discarding the expired drugs and replacing them with new ones periodically in all of the pharmacies. Finally, in all of the pharmacies, the list of emergency drugs was completed and readily available and the staffs were controlled by pharmacies directors for appropriate storage of drugs.

On the other hand, the initials or full name of pharmacist or technician was not written on the pre-

scription when the drug is delivered to patient in more than 80% of the pharmacies.

Furthermore, this was not a medication record containing drug allergy and patient disease diagnosis in majority of hospitals pharmacies. In addition, the pharmacists controlled and supervised the drug prescription in 20% of hospital wards, and the pharmacists checked the side effects and drug interactions and allergies regularly in less than 20% of hospital pharmacies and all of the drugs were completely labeled in accordance with written policies and procedures in less than 50% of the pharmacies.

Table 1: Distribution frequency of organizational structure quality assurance standards indicators in TUMS hospitals pharmacies

Row	Questions	Yes		n		Total	
		n	%	n	%	n	%
1	Is the pharmacy director (pharmacist) a qualified person?	14	93.3	1	6.7	15	100
2	Does the administrator or the pharmacist in charge work in pharmacy for full time?	14	93.3	1	6.7	15	100
3	Is this hospital pharmacy provided a round- the- clock services?	3	20	12	80	15	100
4	In case of being round-the clock services, are there 2 pharmacists working?	1	14.2	14	85.8	15	100
5	Does the pharmacy have organizational chart?	15	100	--	--	15	100
6	Is there another pharmacist working during the temporary absence of the pharmacist in charge?	7	46.6	8	53.4	15	100
7	Does this pharmacy have a satellite unit in outpatient or emergency department?	4	26.6	11	73.4	15	100
8	Does the pharmacist in charge have an formal communication with the hospital administrator?	15	100	--	--	15	100
9	Do the pharmacy staffs have the skill and knowledge of drug dispensing?	15	100	--	--	15	100
10	Is the practice of pharmacy assessed by the hospital pharmacy committee periodically?	12	80	3	20	15	100
11	Are the pharmacy staffs employed by pharmacy administrator?	9	60	6	40	15	100
12	Have the pharmacy administrator new educational programs for training of drug technicians and nurses?	6	40	9	60	15	100
13	Are the drug committee established regularly in hospital?	15	100	--	--	15	100
14	Does the pharmacy director participate in pharmacy committee regularly?	15	100	--	--	15	100

Table 2: Distribution frequency of size, equipment and safety facility quality assurance standard indicators in TUMS hospital pharmacy

Row	Questions	Yes		n		Total	
		n	%	n	%	n	%
1	Dose the pharmacy have a appropriate physical and constructional condition?	8	53.3	7	46.7	15	100
2	Is the pharmacy accessible to hospital wards?	11	73.3	4	26.7	15	100
3	Has the pharmacy a refrigerator for storage of special medications?	14	93.3	4	6.7	15	100
4	Is there sufficient space for secure environmentally controlled storage of drugs and other pharmaceutical supplies?	10	66.6	5	33.4	15	100
5	Is there sufficient cabinet for storage of drugs?	12	80	3	20	15	100
6	Does there pharmacy have appropriate safety equipments and facilities?	14	93.3	1	6.67	15	100
7	Does the pharmacy have general store?	15	100	--	--	15	100
8	Does the pharmacy have appropriate equipments for preparation of dermal sterile drugs and medications?	4	26.6	11	73.4	15	100
9	Does the pharmacy have standard counters?	1	6.66	14	93.4	15	100
10	Are dangerous drugs stored separately or kept with proper label in separate shelves?	12	80	3	20	15	100
11	Are safety precautions and written requirement and drug additional information accessible to pharmacy staffs?	7	46.6	8	53.3	15	100
12	Is the hospital pharmacy inspected by legal authorities periodically to observe clean, well lighted and well ventilated areas and drug prescriptions and medications requirement?	15	100	--	--	15	100
13	Is the pharmacy director required to staffs training to store toxic , narcotic and flammable drugs?	12	80	3	20	15	100
14	Are light sensitive drugs stored appropriately?	14	93.3	1	6.7	15	100

Table 3: Distribution frequency of drug requirements quality assurance standard indicators in TUMS hospital pharmacies

Row	Questions	Yes		No		Total	
		n	%	n	%	n	%
1	Are the necessary and emergency drugs of inpatients dispensed timely?	15	100	--	--	15	100
2	Are the medical equipment of inpatients and operating room provided timely?	15	100	--	--	15	100
3	Does the hospital pharmacy have the list of medications approved by the physicians of the hospital?	14	93.3	1	6.7	15	100
4	Does the pharmacist control the patient prescriptions (e.g. drug interactions, drug prescription and other errors)?	13	86.6	2	13.4	15	100
5	Dose the pharmacist check the side effects and drugs interactions and allergies regularly?	2	13.4	13	86.6	15	100
6	Dose the pharmacy give any information when deliver medications to outpatients?	13	86.6	2	13.4	15	100
7	Could the pharmacist communicate with the physicians about ordered medication if it is needed?	15	100	--	--	15	100
8	Does the pharmacist check the hospital wards periodically to ensure the appropriateness mass of the medications?	3	20	12	80	15	100
9	Is there a list of stored drugs in hospital wards?	14	93.3	1	6.7	15	100
10	Is there a list of stored emergency drugs in emergency room, ICU and other hospital wards?	15	100	--	--	15	100
11	Does the labels include quantity of drugs?	14	93.3	1	6.7	15	100
12	Does the labels include drug use information for patients?	10	66.6	5	33.4	15	100
13	Are the initials or full name of the pharmacist or technician written on the prescription when the drug is delivered to patient?	2	13.3	13	86.7	15	100

Table 3: Continued...

14	Is there an applied protocol for bringing back the decayed and unusable drugs in this pharmacy?	12	80	3	20	15	100
15	Is there a permanent storage of emergency drugs in this pharmacy?	14	93.3	1	6.7	15	100
16	Does this pharmacy control the observation of pharmaceutical standards in different hospital wards?	13	86.6	2	13.4	15	100
17	Do the physicians and nurses consult the pharmacist in charge before administration of drugs to patients?	12	80	3	20	15	100
18	Are there any applied protocols or directions for storage of disinfectants and toxins?	11	73.3	4	26.7	15	100
19	Are the expired drugs thrown away?	15	100	--	--	15	100
20	Does the pharmacy director provide the inventory drugs list in hospital wards?	13	86.6	2	13.4	15	100
21	Are the patients able to consult the pharmacist in charge to be informed about reasons of prescription, effectiveness, and side effects of drugs?	11	73.3	4	26.7	15	100
22	Are drugs delivered according to written orders of physicians or other qualified nurses?	15	100	--	--	15	100
23	Is there any precaution for storage of narcotic and dangerous drugs in pharmacy?	15	100	--	--	15	100
24	Does the pharmacist control the store for discarding the expired drugs and replacing them with new ones periodically?	15	100	--	--	15	100
25	Does any inpatient have a medication record containing the history of drug allergy and his disease diagnosis in this pharmacy?	1	6.6	14	93.4	15	100
26	Are there catalogue of approved drugs containing generic name, quantity and usage information?	14	93.3	1	6.7	15	100
27	Are the records of control and supervision of the purchased and dispensed of drugs kept in this pharmacy?	15	100	--	--	15	100
28	Are the drug containers or labels inspected in hospital wards?	13	86.6	2	13.4	15	100
29	Is the list of emergency drugs completed and readily available?	15	100	--	--	15	100
30	Are there the received to dispensed prescriptions ratio records in a distinct period of time for calculating and analyzing available?	10	66.6	5	33.4	15	100
31	Does this pharmacy have a pharmacopoeia?	14	93.3	1	6.7	15	100
32	Are the patients informed by the pharmacy director about the appropriate use of drugs by brochures or posters?	7	46.6	8	53.4	15	100
33	Is pharmacy director involved in determination of medication protocols and directions?	6	40	9	60	15	100
34	Are the pharmacy staffs controlled by pharmacy director for appropriate of drugs in pharmacy and general store?	15	100	--	--	15	100
35	Are all drugs completely labeled in accordance with written policy and procedures?	6	40	9	60	15	100
36	Does the pharmacist control and supervise the drug prescription in hospital wards?	3	20	12	80	15	100
37	Are the unused drugs returned back to the pharmacy from the hospital wards?	13	86.6	2	13.4	15	100
38	Does the pharmacist control the received prescriptions from the hospitals wards and the drugs to be delivered individually?	13	86.6	2	13.4	15	100
39	Is there a continuous verbal or written communication between the pharmacists and nurses to explain prescription of specific drugs?	14	93.3	1	6.7	15	100

Discussion

The research represents here, is the first of ongoing process to ensure better QA for TUMS hospitals pharmacies. There are several positive attributes of this study. First, to our knowledge, it is the first QA investigation of hospitals pharmacies in IRAN. Second, it is also unique in that we collected data from all TUMS hospitals pharmacies.

Tehran University of Medical Sciences is a reference university between Medical Sciences Universities in Iran and the pharmacy organizing and administrative procedures in this university are quite similar to other hospital pharmacies in this country. Therefore, we can generalize this paper results into the other hospital pharmacies in our country.

Based on this study, it is appropriate that all TUMS hospitals pharmacists are trying to advance the profession, often with the same goal of increasing involvement in direct patient care. Some countries are ahead of others. There are arguments against a universal set of standards given the differences in training of graduates and the wide breadth of activities and responsibilities both inter and intra-country (14).

In our research, we found that the majority of hospitals pharmacies are administered by qualified pharmacists. The pharmacist needs independent, comprehensive, objective, and current information about therapeutics and medicines in use. As health professionals, pharmacists have a duty to begin the process immediately (15). They work closely with other health professionals to optimize drug therapy and patient care management (16, 17).

The director of pharmacy has one of the most complete jobs in the hospital. Planning, leading, and motivating are skills necessary for success (18).

In many countries, the definition and responsibilities of a hospital pharmacist have evolved dramatically, with the recent focus of practice changing from medication oriented to patient outcomes oriented (19).

Pharmacists in many countries, for example, Japan, previously spent a great deal of time in manufacturing of products, but recently, approximately 50% of inpatients received clinical services on the wards in this country (20-22). Even though, the majority of TUMS hospitals pharmacists are qualified, but their role and responsibilities are not identified by government and health policy makers as a clinical pharmacist.

The results showed that only 20% of the pharmacies provided a round clock services and there were more than one pharmacist in care of being round clock services. In addition, 30% of TUMS hospitals pharmacies have a satellite unit in emergency department. "Pedersen et al" reported that pharmacy hours of operation have been increasing in the United States, with 36.2% of hospitals providing around clock services and most full – time salaried pharmacists worked ap-

proximately 40 h a work. Only, 6.8% of the United States hospitals had a pharmacist practicing in the emergency department. Pharmacy leaders must be increasingly aware of opportunities to provide staff with unique scheduling and operational enhancements that can provide for a better work - life balance (23-26).

In our research, all of the pharmacy staffs had skill and knowledge of drug services. All practicing pharmacists obliged to ensure that the services they provide to every patient is of appropriate quality. Good pharmacy practice is a means of clarifying and meeting that obligation. The pharmacist needs independent, comprehensive, objective and current information about therapeutics and medicines in use (27). We think that these quality assurance standard indicators is observed in TUMS hospitals pharmacies.

The pharmacies directors had new educational programs for training of drug technicians in 60% of hospital pharmacies.

The pharmacist in charge should ensure the continuing competence of pharmacy personnel engaged in pharmaceutical practice. The pharmacy follows a written program of training and performance evaluation designed to ensure that each person working in the designated area has the knowledge and skills necessary to perform their assigned tasks properly (28).

The pharmacy committee was established in all of the hospitals and all of pharmacy directors participated in these committee. Furthermore, these committees assess the practice of the pharmacies in 80% of the hospitals. "Mittman and Knowles" reported that pharmacy and therapeutics committees have traditionally evaluated and developed policies for the clinical use of medications and for ensuring safe and effective drug use and administration in Canada (29). Therefore, this quality assurance standard indicator is appropriate in TUMS hospitals pharmacies.

More than 50% of these hospitals pharmacies had appropriate physical and constructional condition and sufficient space for secure, environmentally storage of drugs and other pharmaceutical supplies. Furthermore, the majority of these pharmacies

had safety equipments and facilities and drug general store. Also, 70% of the hospitals pharmacies were accessible to hospitals wards.

Hospital pharmacy must be accessible to the public and by telephone and have a patient counseling area and all schedule 3 drugs stored in compliance with prescribed drugs. Each hospital pharmacy must have prescription preparation counter area that provides for at least 12 square feet of free working space dedicated to the preparation and compounding of prescriptions (30).

Advance drug events (ADEs), or injuries due to drugs, are common and often preventable. However, identifying ADEs, potential ADEs, and medication errors can be a major challenge. "Gandhi et al" reported that health care organizations have the technology to significantly improve their detection of ADEs, medication errors, and potential ADEs. Identification and subsequent classification of events is crucial for quality efforts to improve patient safety (31-33).

It seems the patient safety precautions standards are not observed in most TUMS hospitals pharmacies. These pharmacies need strategies and policy to identify report and monitor the drug events and medication errors.

We found that quality assurance standards of timely drug dispensing and delivering of medications and drugs according to written orders of physicians are observed completely in TUMS hospitals pharmacies. Nevertheless, the standard of checking the hospitals wards by the pharmacies to ensure the appropriate storage of the medications is not observed. However, none of the hospital pharmacies did not use automated drug delivery system and therefore it is not compatible with other research standard results reported as below.

Currently, hospitals only use automated drug delivery machines to store drug in non-pharmacy areas of the hospital, as automated systems provide security and accountability regarding the drugs stored and dispensed from the machines (34).

The traditional floor stock drug distribution system entails that, in most Swiss Hospitals, drugs are prepared in a pillbox for each patient by nurses before administration (35).

To determine the rate and the primary types of medication dispensing errors detected by pharmacists during implementation of drug dispensing system at the Percy French Military Hospital showed that a wide range of errors occurred during the dispensing process (36).

It is essential that TUMS hospitals pharmacies should have policies and procedures for use of automated drug delivery machine and have growth from decentralized to centralized medication distribution system.

Electronic prescribing and patient/medicine identification by bar codes, double checking, employing pharmacists that are more clinical and other regular education may reduce medicine-related errors (37).

"Fahimi et al" revealed that errors at transcription stage were infrequent in Shahid Beheshti University of Medical Sciences Hospital Pharmacies (38).

"Wong et al" showed that medication errors are a major problem in the UK and other countries. "Rosa et al" reported that prescription errors are currently a worldwide public health issue (39).

It is clear that prescribing errors are a common occurrence (40). A more recent article from Israel showed that pharmacists identified and rectified medication errors (41).

Our research results showed that the pharmacists check the patient prescription e.g. drug interactions, drug-prescribing errors, drug side effects and drug allergies in only less than 20% of the hospital pharmacies. Consequently, this standard is not observed in these pharmacies. In addition, there was no standardized system for pharmacist monitoring and appropriate communication and environments to promote best practice. Also, there was no Bar-Code technology and double checking implemented to surveillance this system in-use which might help to decrease medication errors in TUMS hospitals.

In our research, we found that the pharmacists could communicate with the physician about ordered medication if it is needed. However, the pharmacists checked the hospital wards periodically to ensure the appropriate storage of the medications and control the observation of pharmaceutical standards and drug prescription in dif-

ferent hospital wards only in 20% of the pharmacies and the physicians and nurses consulted the pharmacists in charge before administration of drugs to patients in 80% of hospitals pharmacists.

In Pakistan, there are opportunities for pharmacists to become more involved with patient care; however, there are difficulties with identifying their role and responsibilities and having those recognized by hospital administrators, government, and patients (42-43).

In many developing countries, clinical pharmacy has not yet begun to be realized. The role of the hospital pharmacist in Armenia is classic, with the traditional responsibility of storage, production, and distribution of drugs. In Uganda, clinical pharmacy is very much in infancy (44-47).

It seems the pharmacies directors could not control and supervise the hospital wards to ensure storage of medications and this quality assurance standard indicator is not observed in TUMS hospitals pharmacies. However, the other standards like pharmacist in-charge consultation with physicians about ordered drugs administered to patients are observed appropriately. Hospitals pharmacists require authorizing in their hospital to witness destruction of controlled drugs (48). The expired drugs were thrown away in all of the hospitals pharmacies, but there is not an applied protocol for bringing back the decaying and unusable drugs in these pharmacies. Therefore, we think this QA standard is relatively observed in the premises.

There are precautions regulations for storage of narcotic drugs in TUMS hospitals pharmacies. It is compatible with quality assurance standard indicators. Because, as the basis of California State Board Pharmacy, the drugs must be placed in a secure storage facility, pharmacy shall be responsible for the dangerous drugs and devices delivered to the secure storage facility (47).

There is a list of stored emergency drugs in emergency departments and other TUMS hospitals wards. It is compatible with standard indicators. A supply of drugs for use in medical emergencies only is immediately available at each nursing unit as service required (48). The medications to be delivered as emergency pharmaceuticals, shall

be kept in a secure place in or near the emergency room to preclude the necessity for entry into the pharmacy (26).

Only in 40% of TUMS hospitals pharmacies, all drugs are completely labeled in accordance with written policies and procedures. However, the label only includes the quantity of drugs and drug use information in all of the hospitals pharmacies. However, a few of the pharmacies observed these standards such as the initials or full name of pharmacist or drug technician written on the prescription when the drug is delivered to patient.

All drug containers in the hospital shall be labeled clearly, legibly and adequately to show the drug generic and/or trades name and strength when applicable. Labels on medications used for outpatients, emergency room, and discharge drug orders shall meet the requirements. As a minimum, the label shall indicate name and location of the patient, name, and amount of drugs added, appropriate dating, initials of the personnel who prepared and checked the drug (26). Unit dose medication and parenteral admixtures should be properly labeled and indicated the required information (49). Consequently, drug-labeling standards are not observed appropriately in TUMS hospitals pharmacies.

The implementation of quality assurance based on hospital pharmacy standards requirements is a very good opportunity for TUMS hospital pharmacies to improve the quality of pharmaceutical process and practice achieve the expected results. Many of quality assurance standard indicators are observed and implemented in TUMS hospital pharmacies, but several of these standards are not observed too.

Even though, QA guidelines utilized here, are specific to Tehran University of Medical Sciences Hospitals Pharmacies, but we are going to share this guidelines and the paper results with Ministry of Health to implement this requirements for change of assessments and quality Improvement policies in other hospitals pharmacies practice.

The authors suggest several proposals to improve quality assurance program in TUMS hospital pharmacies:

- The pharmaceutical services shall establish a pharmacy quality assurance program and the director of pharmacy should develop clinically oriented program (26).
- Each hospital pharmacy licensed by TUMS Board of Pharmacy is required to accomplish a self - assessment program (50).
- A Bar Code Medication Administration shall be implemented at all of the hospitals pharmacies. The Bar-Code technology can reduce medication errors (51).
- Importance of health safety guarantees is provided by the “pharmaceutical chain” that bring the medicine until his user (from manufacturers to dispensing pharmacists), chain of which the security of each link is controlled and guaranteed by pharmacists (52).
- The Joint Commission required hospitals to have a procedure of reconciliation process and policy implementation and development program. Audit, feedback, and education are key components in the program’s operation and improvement (53).
- Computerized Provider Order Entry (CPOE) systems as an effective tool for reducing preventable adverse drug events should be used; however, implementation is a complex process that involves much more than installing new software (54).
- A change in culture will be necessary if a national strategic plan for hospital pharmacy manufacturing to be successful. Aspects of the culture that is required is a more from using trading accounts in monitoring the performance of manufacturing units and the need to share information integration, not competition (55).
- To develop, implement, and assess a required pharmacy practice course to prepare pharmacy students to evaluate clinical pharmacy services using a business plan model (56-57).
- A strong culture in social pharmacy or pharmaceutical policy research will not only be helpful to establish clinical pharmacy practice, but it would also be supportive enough to

provide manpower to the country’s proposed drug regulatory authority (58).

- Hospital pharmacy aims at optimizing pharmaceutical care practice. It is necessary to evaluate the satisfaction of hospital pharmacy customers, physicians, nurses and pharmacy staff (59).

Concurrently, Healthcare providers and pharmacists have been under increasing pressure from consumers, legislators and insurance organizations to improve the efficiency and quality of their services (60). QA program provides the necessary tools for organizing and effectively implementing quality practice for a pharmacy department for creating an environment that promotes on-going quality improvement for the department. This program is a must for any department manager trying to organize and orchestrate an effective quality assurance program in a health care institution (61).

We hope, the results of this research will be used as a new quality tool to improve teaching and practices for the School of Medical, Nursing, and Pharmacy of Tehran University of Medical Sciences.

Ethical Considerations

Ethical issues Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

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