


A review on patient safety

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Abstract

Background: Patient Safety Events (PSEs) are important preventable issues with high morbidity and mortality rates, imposing high costs and the occurrence of legal and social problems in societies. Therefore, having a prevention program is very important for it. In this study, we have selected the most common and important errors and provide simple preventive measures for users.

Methods: In this review study, to obtain information associated to patient safety prevention, we used the scientific reliable literatures, registered in US National Library of Medicine/National Institutes of Health (PubMed), Google Scholar and Scopus data banks.

Results: Simple preventive measures for prevention of mistakes due to misidentification (nominal similarities, displacement of the patients, switching the newborns, etc.), miscommunication (improper communications, patient disrespect, misinterpretations due to language differences, giving bad news, etc.), misinterpretations, irrational administration and use of drugs (inappropriate medication, for the wrong patient, with wrong amount, via the wrong way, and for the wrong duration), incompatible blood transfusion, mistakes in anesthesia, surgeries and other procedures, medical complications due to PSEs (Health care associated infections, trauma and fall, thrombophlebitis and thromboembolism, bed sores, suicide, violence, and mismanagement of the hospital affairs were extracted and suggested to the hospital authorities.

Conclusion: We have extracted numerous suggested preventive measures from the accomplished studies for prevention of unpleasant patient safety related events in the hospitals.

Keywords: Health Services Security; Humans; Patient Safety; Drug Safety; Safety in Surgeries

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Introduction

Patient safety is one of the great challenges of health systems in the world, which all people in the health team are somehow involved with its unfavorable results. Patient safety in the hospital may be happened for various reasons such as misidentification, miscommunication, drug errors, errors in the process of surgeries and medical

interventions, medical complications, systematic and managerial or administrative errors, technological problems and so on.

Approximately 5 to 10 percent of health costs are due to unsafe clinical services that can lead to injuries of the patients. The American Institute of Medicine, estimates direct and indirect costs of these unwanted preventable events around 17 billion \$ (1).

In the 22 countries of the Eastern Mediterranean Region of World Health Organization, with population more than 530 million people, there are about 8,600 public and private hospitals with around 30 million patients per year. If about 10% of these patients encountered with unsafe services, three million people are injured annually, which 75% of them can be prevented (1). In Iran, 55,000 medical errors are reported annually, of which 10,000 and five hundred cases result in death and 23,000 cases of them lead to organ failure (2).

One of the five medicines used by nurses for patients is a drug error. Annually, about 1.5 million people are suffering from complications due to medication errors, and about 7,000 people have been died from these complications.

The cost, related to medical errors in the United States is 76 to 136 billion USD in each year. Medication errors along with the fall of patients from the bed are two important indicators for assessing the quality of nursing care in clinical settings (2). Millions of surgical procedures along with general anesthesia are performed annually in the world. For example, in South Korea in 2012, 7 million patients were subjected to general anesthesia for low-risk surgeries. Sometimes the patients get awareness during the surgeries. If we consider the risk of this event to be 0.1% to 0.2%, we should say that in this country alone, every year, from 7,000 to 14,000 patients, will find their consciousness during the surgeries (3).

Many of the blood transfusion complications are related to non-compliance with blood transfusion indications (4). The overall incidence of unsafe events in the hospital is estimated at 10%, of which three-quarters are related to surgeries, and at least half of these events can be prevented in the framework of current patient care standards (2). Improving the patient safety indices, requires a cultural context, including: values, competencies, abilities and

behaviors that must be undertaken by hospital officials in all activities (5). In Islamic doctrine, there is a rule which known as “La zarara va la zerara fi lislam” and this rule prohibits harm to human life. In this phrase, “Zarar” means “Involuntary harm” and “Zerara” means “intentional harm” (6).

It seems that, if hospital staff believe to this humanistic point and act on it, the patient's safety status will be much better than the current situation. In Iran, there has been implemented the Patient Safety Friendly Hospital Initiatives by Ministry of Health and Medical Education since 2010 as yet. In this initiative, 120 standards and indicators are followed up and right now it need to be evaluated (7).

In this study, we have tried to attract the attention of health managers and hospital staff to this area. We have selected the most common and important errors from hundreds and even thousands possible errors, and provide simple preventive measures for them.

Methods

This is a review study. In this study, at first, we tried to list the common reported problems which caused by unsafe services in the hospitals, then find a preventive solution for each one. In the first stage we have obtained the following keywords: miss identifications- communication problems- prescribing and taking medication errors- mistakes during blood transfusion- anesthesia, procedures, and surgeries related errors- errors that lead to complications such as: hospital infections, falls, suicides, violence, rape, abuse-thrombophlebitis, thromboembolism, bedsores and managerial mistakes. To information gathering, we used the scientific reliable literatures focused on the above key topics and registered in PubMed, Google Scholar and Scopus data banks. To confirm the quality of the articles, only the publication of those in the mentioned banks has been considered.

Literature review continued up to fulfillment of information required in each subject related to patient safety.

We tried to use only studies that addressed the practical aspects of prevention of the points that endanger the patient's safety in the hospitals.

Important note: The obvious points mentioned in numerous texts, rational items for which a valid reference was not found (for example, advertise a factory), practical

author's inferences from the findings of the existing studies, author's experiences, and logical suggestions that require more researches, are shown with "RE" which means "Reminder" in the tables.

Results

The results of this review are summarized in 14 following tables.

Table 1. Common Mistakes in Patient Identification and the ways to prevent them

Miss identifications		
Mistake / problem	Prevention order	Ref.
Mistake due to nominal similarity of patients and medications.	<ul style="list-style-type: none"> • Ensure the correctness of patient's profile (first name, surname, age, and number of bed) before medication or implement any procedure. • Use of bar-code medication administration (BCMA) system. • Use of Electronic Health Record (EHRs) equipped with a bar code system. The software for these files can also be installed on the tablet pocket of doctors and nurses. 	8,9,10
<ul style="list-style-type: none"> • Babies switched at the birth. • Breast feeding to baby by another mother in NICU. • Baby stealing. 	<ul style="list-style-type: none"> • Get fingerprints, foot prints, or palm prints from babies. • Use of colored bracelets (red indicates allergic reaction, yellow indicates a risk of falling, and green indicates latex sensitivity) (RE). • Write the mother's identification. Characteristics on the baby's bracelet. • Control of traffic in neonatal wards (RE). 	8,11
Replacing the patient's bed without enough notification.	Use of Electronic Health Record system.	10,12
Getting lost the patients with dementia and Alzheimer's disease.	Use of Global positioning systems (GPS) or Geographic information systems (GIS) techniques to track the location of patients.	13
Unknown patient for new nurse due to shift switching.	Provide complete patient information to the next shift (RE).	12

RE: Please refer to the description mentioned in the beginning of the results section.

Table 2. Common mistakes in communication problems and the ways to prevent them

Communication problems		
Common mistakes	Preventive points	Ref.
Neglect the principles of proper communication.	<ul style="list-style-type: none"> • Listening to the patient's complaints • Empathy • Attracting trust • Allowing for physical examinations • Preservation of patient privacy in examinations • Answering honestly his /her questions 	14,15,16
Linguistic problems and miss understanding the conversations.	Use of the translator (RE).	12
Disrespect to dignity of the patients.	Obsession to respect patients. Reverence for humans (patients and clients).	15,17
Inappropriate presentation of bad news to the patient.	Empathy and compassion with the patients.	18
Disregard for the Patients' Rights.	<ul style="list-style-type: none"> • Monitoring the observance of the Patients' Rights Charter. • Physical examination of the patient by doctor with opposite gender in the presence of a nurse (RE). 	19

RE: Please refer to the description mentioned in the beginning of the results section.

Discussion

In this study, Patient safety in different domains, including misidentification, miscommunication, misinterpretations, irrational administration and use of drugs, incompatible blood transfusion, unsafe anesthesia, surgeries and other procedures, hospital infections, trauma and fall, thrombophlebitis and thromboembolism, bed sores, suicide, violence, and mismanagement of the hospital affairs was discussed.

By reviewing the literatures, we found that, if we promote managerial indicators in the hospitals, many of the patient's safety problems will improve.

Of course, although all of the above issues are important, among those, except "managerial activities" the subjects of "Identification and communication", "drug prescribing", and "surgeries and other procedures", due to the emergence of legal and social problems, are more important than the others.

In the context of misidentification, many points are discussed. for example, Sauer et al, in their study have reported that, in the Neonatal Intensive Care Unit (NICU) of a Baby-Friendly Hospital, two premature newborns (Baby A: 32 weeks and Baby B: 34 weeks) were admitted.

Baby B moved to a different bed during change of nursing shift. The mother of baby B, who was Spanish and recently immigrated to the United States, entered the unit and walked up to her baby's bedside. The nurse responsible for the baby B, who did not know the Spanish language, without checking the mother's identification bracelet, handed her the Baby A. The mother of baby B then began breastfeeding of baby A (12). This seemingly simple event, caused a lot of trouble for hospital officials. Therefore, enough awareness for displacement of the patients, the ability of correct verbal communication and check identification bracelets are important factors to prevent unsafe services.

Table 3. Common mistakes in General diagnosis and treatment associated errors and the ways to prevent them

General diagnosis and treatment associated errors		
Common mistakes	Preventive points	Ref.
Not consulting for timely diagnosis. Unnecessary requests of consultations, para clinical tests and imaging. Unnecessary surgeries and procedural measures such as: cesarean sections, endoscopies, non-specialized massage etc.	<ul style="list-style-type: none"> Rational request of medical consultations, laboratory tests and diagnostic imaging. Strengthen medical supervision (RE) 	20 21
Delay in diagnosis and treatment of the diseases.	Decrease the distance between the first visit and the definitive diagnosis (RE)	22
Keeping the patient in hospital for a long time.	Reduce the length of stay in a hospital	1
<ul style="list-style-type: none"> Long time Fluoroscopy Using radiation without protection (RE) Fulfill of Radiography for pregnant women without questioning their pregnancy (RE) 	<ul style="list-style-type: none"> Use of radiation protection equipment in radiographies, radiotherapies and nuclear medicine processes. Ensure women are not pregnant for radiographies. 	1
Not to use protective equipment.	Use of protective teas in neonatal phototherapy, laser therapy and ...	(RE)
Injection of contrast material, without accomplishing the preventive measures and kidney failure occurrence.	Sufficient liquid injection and use of N-acetyl- cysteine before contrast material injection.	23
Forgetting heart monitoring especially in dysrhythmia.	Use of Wireless Heart Monitoring (WHM) devices.	24
Failure to pay attention to the pain of patients, especially children.	<ul style="list-style-type: none"> Appropriate pain management Using behavioral and psychological techniques, play therapy (children are often interested in play), etc. in reducing pain. 	11 16 23
High working hours (more than 8 hours per shift) and Excessive tiredness and sleeping of doctors during work.	Proper work planning and shift divisions.	25 1
Inappropriate mental states of the medical staff (except fatigue), such as: anger, stress, alcohol consumption, etc.	Supervision of shifts.	1
Applying of non-documented Complementary medicine approaches.	Emphasis on evidence based medicine.	26

RE: Please refer to the description mentioned in the beginning of the results section.

Table 4. Common mistakes in prescribing and taking medication and the ways to prevent them

Mistakes in prescribing and taking medication		
Common mistakes	Preventive points	Ref.
Irrational administration of drugs, especially antibiotics (spread of microbial resistance). <ul style="list-style-type: none"> • Inappropriate age (children or elderly) • Unclear writing • Wrong orders • Wrong dosages (Over or inadequate dosages) • Wrong utilization way • Wrong administration duration • Wrong consumption intervals • Miscalculation of the dosage of drugs that can be fatal • Wrong method of use (E.g. quick injection of potassium in vein) hastily and occurrence of shock and even death • Neglect drug interactions • Give multiple medications with together 	<ul style="list-style-type: none"> • Rational administration of medications (The correct drug, for the correct person, with the correct amount, via the correct way, and for the correct duration). • Properly calculate the concentration of drug solutions. 	1,2,27,28
Use of a patient's specific drug for another patient.	Use of bar-code medication administration (BCMA) system.	2,9
Wrong transcription of prescribed drugs by the nurses.	Use of Electronic Health Record (EHRs), equipped with a bar code system. The software for these files can also be installed on the tablet pocket of doctors and nurses.	1,2,10
Giving the wrong medication because of the similarity of the name, shape, labeling and packaging of drugs.	Applying generic name for prescription drugs.	1,27
Detachment or destroying of drug labels.	<ul style="list-style-type: none"> • Correct labeling of medication • Dispose of drugs that do not have labels 	1,11, 27
Forgetting to give / use of medicine.	<ul style="list-style-type: none"> • Use of medication Boxes (RE) • Use of medicine alarm reminders (RE) 	29
Prescribing some medicines such as: anticoagulants, potassium, Streptomycin for elderly patients, etc. Without monitoring.	<ul style="list-style-type: none"> • Use of alarm systems such as: Heparin Infusion Pump to prevent heparin-induced hemorrhage. • Setting the serum droplets with micro set. 	1,29

	<ul style="list-style-type: none"> Monitoring of hearing with physical examination and audiometry if needed (RE) 	
Prescribing drugs to people who are allergic, addict or pregnant, regardless the specific circumstances.	Medical history taking	1
Poly pharmacy	Control of poly pharmacy with harmony between disciplines, using clinical pharmacologists.	1,30

RE: Please refer to the description mentioned in the beginning of the results section.

Table 5. Common mistakes in blood transfusion and the ways to prevent them

Mistakes in blood transfusion		
Common mistakes/problems	Preventive points	Ref.
<ul style="list-style-type: none"> Incompatible blood transfusion. Untreated blood transfusion. Not screened Blood transfusion. 	<ul style="list-style-type: none"> Check patient specifications for compatibility confirmation. Cross matching. Refinement, filtering and blood screening. Use of washed red blood cells (of course not routinely). 	23,31, 32
Not needed blood transfusion.	<ul style="list-style-type: none"> Ensuring the real need for blood transfusion Considering transfusion indications (disorders with hemoglobin 7 or 8 mg / dl) including: <ul style="list-style-type: none"> Bleeding during surgeries Traumatic bleeding Septic shock Coagulation disorders Blood and bone marrow malformations Kidney failure Nutritional anemia Chronic infectious diseases (RE) 	4
Occurrence of allergic reactions.	Prescribing paracetamol, antihistamines and corticosteroids in some cases, before transfusion.	23

RE: Please refer to the description mentioned in the beginning of the results section.

Table 6. Common anesthesia related errors and the ways to prevent them

Anesthesia related errors		
Common mistakes	Preventive points	Ref.
Anesthesia machine failure.	<ul style="list-style-type: none"> • Full technical checking of the accuracy of anesthesia machine before applying. • Periodic technical checking of anesthesia machines (RE). 	1
Sedation level: <ul style="list-style-type: none"> • Under sedation or inadequate anesthesia (get the patient awareness during surgery, especially in women, addicts, previous history of awareness during surgery, and use of neuromuscular blocking agents). • Occurrence of Post-Traumatic Stress Disorder (PTSD) sometimes after the surgery. • Over sedation (RE). 	<ul style="list-style-type: none"> • Adequate assessment of patients before anesthesia. • Provide adequate analgesia for the patient. • Involving experienced patients in the process of anesthesia. • Use the WHO Surgical Safety Checklist (SSC) in the operating room. 	1,3,4,26
Use of halothane in liver failure for the anesthesia of patients undergoing surgery. Halothane is an anesthetic that causes liver damage, and is known as halothane induced liver injury (HILI).	Ensure the correctness of the liver function before taking halothane gas for anesthesia (RE)	33
Use of matches, lighters, or electro cautery, near the flammable agents such as oxygen, alcohol, nitrous oxide, ethylene oxide and so on, which may cause fire in the operating room.	In the event of a fire, if the fire extinguisher capsule is not available, it can be used normal saline for immediate extinguishing the initial fire point.	34
Non-reservation of the ICU bed for critical surgical patients.	Forecast of ICU bed after major surgery.	1
The other errors: <ul style="list-style-type: none"> • Getting out the control of the airways and occurrence of respiratory dysfunction. • Misuse of toxic gases instead of oxygen due to similarity of the tank (RE). 	Recheck and marking the body of anesthetic gas tanks (RE).	1

RE: Please refer to the description mentioned in the beginning of the results section.

Table 7. Common surgical related errors and the ways to prevent them

Mistakes in surgeries		
Common mistakes	Preventive points	Ref.
Not ready of: <ul style="list-style-type: none"> • surgical team • operating room • Equipment required • Additional requirements 	Use the WHO Surgical Safety Checklist (SSC) in the operating room. <ul style="list-style-type: none"> • Coordination of system • Check out the patient profile • Check the team's readiness • Check the required equipment (E.g. instruments, implants, etc.) • Estimate bleeding amount and adequate blood supply. • Check the patient's position. 	1,4
Performing an operation or procedure for patients with nominal similarity.	Use of identification techniques (RE).	8,9,10,11
Surgery in the wrong anatomical location such as: <ul style="list-style-type: none"> • Surgery of the opposite organ (Mistake of right part with left part and vice versa. E.g. right inguinal hernia instead of the left one). 	<ul style="list-style-type: none"> • Mark the targeted organ before initiation the surgery. • Ensure the correct placement of radiographs on the negatoscope, to avoid making a mistake right side with the left side or vice versa. 	1,34,35
Unnecessary or not indicated surgeries such as, unnecessary: <ul style="list-style-type: none"> • Appendectomy • Hysterectomy • Lymphadenectomy • Amputation • Cesarean section • Pulling a healthy tooth instead of a rotten tooth. • Excision of cold abscess, without Simultaneous medication. etc. 	Emphasis on the indication of surgeries. For E.g. Cesarean section indications: <ul style="list-style-type: none"> • Abnormal positions of the fetus • Previous cesarean section • Maternal diseases such as diabetes • Eclampsia • Fetal distress syndrome, etc. 	37,38, 39, 40,41,42
Amputation related errors including: <ul style="list-style-type: none"> • Unnecessary amputations • Excessive amputation • Postpone of amputation 	Consultation with vascular surgeon (RE).	39,40
Make complications due to technical mistakes in surgeries such as: <ul style="list-style-type: none"> • Make Gossypiboma (Leaving the gauze pads and surgical instruments in the body). • Fecal incontinence due to anal sphincter damages. 	<ul style="list-style-type: none"> • Count the number of gauze pads used in the surgery before and after the operation using the gauze counting system. 	1,43,44

<ul style="list-style-type: none"> Emerging the surgical site infections (SSIs). Interrupting the physiological functions of respiratory tract in nose surgery (RE). 	<ul style="list-style-type: none"> Observance of decontamination and aseptic regulations: <ul style="list-style-type: none"> Hand washing Cleansing, disinfection and sterilization 	
<p>Post-surgical Neglects</p> <ul style="list-style-type: none"> Neglect hematoma or bleeding after the surgery. Disregard for the safety of tissue samples that have been surgically removed. 	<ul style="list-style-type: none"> Regular monitoring the patient (RE). Care of the patients until complete return their consciousness. Train the people who take the samples to the lab. 	1

RE: Please refer to the description mentioned in the beginning of the results section.

Table 8. Common mistakes in minimally invasive procedures and the ways to prevent them

Mistakes in minimally invasive procedures		
Common mistakes	Preventive points	Ref.
<p>Unnecessary or not indicated medical procedures such as, unnecessary:</p> <ul style="list-style-type: none"> Urinary catheterizations Endoscopies (impose costs, rarely perforation, etc.) CT scans, MRIs, or other imaging procedures (RE) 	<ul style="list-style-type: none"> Emphasis on vocational and professional training skills (RE). Use special capsules for endoscopies (Pillcams) to prevent the possible perforation (RE). 	RE
<p>Disuse of instruments examples:</p> <ul style="list-style-type: none"> Tracheal tube insertion in the esophagus which may cause interruption of respiration. Placement of nasogastric tube in the trachea in the absence of cough reflex among anorexic people which will cause pneumonia, pneumothorax, pulmonary hemorrhage, etc. And should be removed quickly. Inappropriate removing of urinary catheter from the bladder which can cause urethral injuries (RE). Breaking the hepatic artery during liver biopsy due to lack of adequate skill. Removal of diaphragmatic tissue instead of liver tissue in liver biopsy. Use of large weights in tractions. Newborn being injured during the use of forceps and vacuum. Use of various types of radiation and waves to diagnose and treat diseases. 	<ul style="list-style-type: none"> Installing the nasogastric tubes, under direct vision with laryngoscope video technique. Avoiding from unnecessary urinary catheterization by accurate applying of protocols. Use of single-use devices in procedures Use of radiation and waves protocols. Protective recommendations for the patients who have vascular stents or pacemakers. 	45,46

RE: Please refer to the description mentioned in the beginning of the results section.

Table 9. Common mistakes that lead to infection and the ways to prevent them

Mistakes that lead to infections		
Common mistakes	Preventive points	Ref.
Non observance of: <ul style="list-style-type: none"> • Hand hygiene • Standard precautions • And aseptic regulations 	<ul style="list-style-type: none"> • Physicians and nurses hand hygiene monitoring, give feedback to them via SMS. • Remove bracelets, watches and ornaments before operation. • Observance of standard precautions, aseptic regulations, cleaning, disinfection and sterilization of equipment in surgeries and • Use personal protective equipment such as: gloves, masks, gowns, aprons, shields, glasses, and safety boxes for needles and sharp objects. 	1, 47, 48
Performing elective surgeries in diabetic patients without control of their blood glucose.	Blood glucose control in diabetic patients under 200 mg / dl	49
Forgetting Prophylactic antibiotics administration.	Prophylactic antibiotic administration 60 minutes before the surgery.	48
Non-documentary treatments. Urinary or intravenous catheterization without indication.	Monitor the exact implementation of infection prevention and control guidelines.	1
Neglect the personnel immunization.	Vaccinate for hospital staff, especially for hepatitis B.	1
Reuse disposable products.	Avoid re-using disposable products	1

Table 10. Common mistakes that lead to trauma and fall induced injuries in the patients and the ways to prevent them

Mistakes that lead to trauma and fall induced injuries		
Common mistakes	Preventive points	Ref.
Prescribing relaxant and sedative medicines for the elderly, disabled and patients with: <ul style="list-style-type: none"> • Muscle weakness (muscle dystrophy) • History of fall • Gait instability • Confusion • Urinary frequency or incontinence • Balance disturbances • Use of rehab devices • Visual disturbances • Arthritis 	<ul style="list-style-type: none"> • Exact history taking for the risks • Avoid prescribing hypnotics to the elderly patients • Patients and staff training • Treatment of main problem 	50

<ul style="list-style-type: none"> • Depression and memory disorders 		
<p>Neglect the environmental barriers that may cause fall, such as:</p> <ul style="list-style-type: none"> • Slippery and rough grounds • Environmental low light • And environmental contaminations • Disregard to beds without guarded edges 	<ul style="list-style-type: none"> • Environmental assessment and removal of environmental barriers • Use of anti-slip and anti-fall shoes and socks, carpet brakes and anti-slip bath flooring. • Provide enough light for the environment • Cleaning and decontamination of the environment • Check the edge of the patient's bed • Use the Bed alarm <ul style="list-style-type: none"> • Use of fall warning bracelets (Medic Alert) and Patient Safety Alarms (PSAs) • Use the Hip Protector for the elderly patients 	23, 46, 51
<p>Staff malpractice examples:</p> <ul style="list-style-type: none"> • Releasing the stretcher from the hands of the servants • Inappropriate transport of spinal cord injured patients • Getting around of the patients with multiple trauma • Use of high weights in tractions • Delivery related trauma 	<ul style="list-style-type: none"> • staff training • Use standard stretcher and the vehicle for carrying the patients • Use the wheelchairs belts • Use convenient handles on the bed, toilet, bath, hallway, stairs etc. • Continuous monitoring of staff performance 	(RE)

RE: Please refer to the description mentioned in the beginning of the results section.

Table 11. Common mistakes that lead to suicide, violence, rape or abuse and the ways to prevent them

Mistakes that lead to suicide, violence, rape or abuse		
Common mistakes	Preventive points	Ref.
<ul style="list-style-type: none"> • Neglect of a patient with major depression, particularly patients with a history of suicide. • Availability of dangerous objects for suicide. 	<ul style="list-style-type: none"> • Patient monitoring with cameras. • Protecting the windows of clinical wards, especially psychiatric wards to prevent mentally ill or depressed patient suicide. • Get out of reach the dangerous objects such as: rope, wires and similar objects, cold or hot weapons, sharp objects, drugs, oil, gasoline, matches, lighters or electricity etc. 	52,53
Neglect the anesthetized patients	<ul style="list-style-type: none"> • Take care of anesthetized patients in recovery rooms after the surgery. • Take care of the patients after surgery during transition to the department 	(RE)

RE: Please refer to the description mentioned in the beginning of the results section.

Table 12. Common mistakes that lead to thrombophlebitis and thromboembolism and the ways to prevent them

Mistakes that lead to thrombophlebitis and thromboembolism		
Common mistakes	Preventive points	Ref.
The extreme orders for “absolute rest” of the patients.	<ul style="list-style-type: none"> • Quickly move patients after surgery • Use of preventive heparin and warfarin 	23
Non observance of intravenous injection standards.	<ul style="list-style-type: none"> • Eliminating factors affecting the formation of phlebitis such as: injectable agents, pathway of injection, staff related factors (experience -Fatigue and drowsiness, personal hygiene - etc.), factors related to the recipient (age – immune status - underlying disease, etc.), Site of injection (low or upper), antisepsis of the site, type of needle and catheter, etc.). for example: <ul style="list-style-type: none"> - Use of short, thin, metal and antibiotics impregnated needles. - Use of a needle or catheter fixator in the vessel to prevent surface thrombophlebitis 	(RE)

RE: Please refer to the description mentioned in the beginning of the results section.

Table 13. Common mistakes that lead to bedsores (pressure wounds) and the ways to prevent them

Mistakes that lead to bedsores (pressure wounds)		
Common mistakes	Preventive points	Ref.
Neglect the patients with: <ul style="list-style-type: none"> • Sensory disturbances • Urinary and stool incontinence • Malnutrition • Immobility • Spinal cord injuries 	<ul style="list-style-type: none"> • Use of wavy mattress. • Regular patient placement. • Use cushion pads (anti-ulcer pads). • Soft and gentle massage of the at risk points. 	23

Table 14. Common managerial mistakes and the ways to prevent them

Managerial mistakes		
Common mistakes	Preventive points	Ref.
<p>Manpower problems:</p> <ul style="list-style-type: none"> • Employing of uninteresting, Knowledge less, inexperienced, unwilling, and frustrated staff • Tired and exhausted staff 	<p>Review the selection process of employees Staff training on issues such as:</p> <ul style="list-style-type: none"> • Juridical charter of patients • Career skills (via practice-based workshops) 	5,54
<p>Infrastructure problems:</p> <ul style="list-style-type: none"> • Undesirable wards, operating rooms, ICUs, isolated room, Labs, etc. • Insufficient beds • Contaminated water, air and surfaces • Contaminated of poor quality food • Unsafe electrical system (sockets, wires, high power consumption, repeated disconnection of power supply, inadequate lighting, etc.) • Undesirable toilets • Uncontrolled infectious, chemical and radioactive wastes • Uncontrolled hospital traffic • Equipment-related problems (absence, failure or defect) 	<ul style="list-style-type: none"> • Provide needed spaces like: isolation conditions for contagious patients, etc. • Monitoring of the wards and environmental issues in the hospital. • Setting up the unit for monitoring, repairing and maintaining medical equipment. • Provide safety and security of the hospital environment. • Control of hospital traffic. • Provide needed equipment such as: HEPA filters for operating rooms, dust mite detectors and protectors, digital proper monitoring systems, protective personal equipment (PPE), etc. • Remove old and uncertain equipment from the category of use. • Prediction of power outage in sensitive areas. 	1,48, 49, 55
<p>Inappropriate planning:</p> <ul style="list-style-type: none"> • Lack of hospital committees their inactivity. • High complaints from services quality. • High rates of death, complications and hospital infections. • Irrational administration of drugs. • Unreasonable request for diagnostic tests. • Abuse of patients. 	<ul style="list-style-type: none"> • Activate hospital committees. <p>In Iran, 11 different committees which are predicted for the hospitals are as follows:</p> <ul style="list-style-type: none"> - Quality Improvement - Mortality and complications - Drugs and Treatment - Ethics - Technical protection and occupational health - Medical records and information technology - Environmental Health - Prevention and Control of Infections - Crisis and disaster 	11, 54, 56, 57,58

<ul style="list-style-type: none"> • Failure to implement the charter of patients. • Disregard for the possibility of sexual assault for patients, especially among psychiatric patients. • Lack of surveillance system and hospital MIS • Lack of a program for responding to accidents and disasters. • Lack of a preventive program for especial issues such as: normal delivery, patients with dementia or Alzheimer's disease, etc. • Provide hospital needs (equipment, agents, etc.). 	<ul style="list-style-type: none"> - Transfusion - Maternal and infant immunity, promotion of normal delivery and breastfeeding • Launching a patient safety campaign in the hospital. • Providing confidentiality requirements for physical examinations and security in the electronic system (password for electronic programs - installing new antivirus software, etc.). • Developing, implementing and monitoring the use of guidelines and prevention protocols. 	
<p>Inappropriate supervision:</p> <ul style="list-style-type: none"> • Weak surveillance system (medical information system) • Weak monitoring and supervision activities • Weak assessment and evaluation activities 	<ul style="list-style-type: none"> • Set up a reporting system such as the Patient Safety Reporting System (PSRS). • Launching a phone tracking system for discharged patients. • Launching a targeted supervisory system (RE). 	11, 59

RE: Please refer to the description mentioned in the beginning of the results section.

As well as, Use of Bar-Code Medication Administration (BCMA) system, including electronic pharmacy management is one way to prevent mistakes. This is a cost-effective measure which will prevent, medication errors, misdiagnosis due to displacement of laboratory tests, and doing wrong procedures for wrong people (9).

Correct communication is another important issue. Pupulim et al, in a qualitative study, asked the view- points of 34 patients who hospitalized for at least 3 days, about observance of human dignity, respect to the patients, attention to independence of the patients and observance of their privacy. They showed that, the most important request of understudied people from the hospital staff

was to “respect” them (15). Therefore, respect for the patients is a principle and everyone should do it under any circumstances.

In communications, one important issue that should be considered is “empathy”. Sinclair et al, have been discussed the closely related terms of sympathy, empathy and compassion in one study. They have explained, sympathy is an emotional reaction. In this condition, the patient feels pity that is not a good impression. In contrast, empathy is ability of understanding the patient's problem and is accompanied by acknowledge of the patient's feeling. In other words, empathy means understanding of a person's situation by “feeling with” him/her.

So, on the contrary of sympathy, empathy and compassion have a positive effect on patient care (16). Therefore, carrying out these two behaviors are emphasized.

Most of the mistakes that occur by the nurses, are at the time of transcribing and giving medicine to the patients. Giving multiple drugs, especially antibiotics, at one time, due to lack of personnel and a large amount of work, is a common malpractice which causing drug interactions and compromising patient safety (2).

Misidentification of drugs due to similarity of name, shape, labeling and packaging are common (27). For example, celecoxib, an anti-inflammatory drug, with trade name of Celebrex, with Fosphenytoin, an anti-seizure medication, with trade names Cerebyx can be confused with each other. Therefore, it is better to use the generic names of the drugs. In the case of the similarity of packaging, an example is phytonadine 25mg which is similar to phytonadione 50mg and this similarity may lead to mistake (1).

Another mistake occurs in the manner and frequency of drug use. For example, Vincristine should only be used intravenously and transmitted via mini bags. It has been reported that this drug has been injected into the spinal canal and caused the death of the patient (1).

Nowadays, a global phenomenon that threatens the health of patients, especially the elderly, is polypharmacy. For example, in one case, at the same time, several physicians, 18 different drugs, were prescribed for an 81-year-old woman who referred to bone pains associated with osteoporosis (1).

In the case of inadequate pain control after the surgeries, studies have shown that, every year, 1.5 million children are undergoing surgery and many of them do not adequately pain control and even, their pain become chronic in 20% of cases (11). Therefore, attention to pain control after the surgeries, especially in children, is a vital measure.

In the case of inadequate pain control, many of which do not adequately pain control and even, their pain in 20% of cases become chronic (11) and this is a clear example for unsafe services.

Every day, from every 1,000 people in the general wards of the hospitals, 2.2 fall down. This number in rehabilitation departments is 20 of which 30% are injured. These injuries are mostly bone and pelvic fractures, soft tissue damages and hematoma, which at least cause the patients complaints and prolongation of hospitalization (50).

With proper management and applying innovative actions, some of these problems can be solved. Ozieranski et al, have launched a patient safety campaign in several hospitals. This action has been effective in timely notification and staff motivation for solving problems (57).

Conclusion

We have extracted numerous suggested preventive measures from the accomplished studies for prevention of patient safety events in hospitals. Our inference is that; the hospital managers are the most important people who can reduce the patient's safety problems by providing the required conditions.

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Conflict of interest

Authors declare no conflict of interests.

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