

Pharmacy Safety and Occupational Health: Fire Safety Perspectives

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ABSTRACT

Objectives: To explore the occupational safety and health emphasis on fire safety policy and procedures in pharmacy practice as a new initiative in Saudi Arabia.

Methods: It was a narrative review of pharmacy practice fire safety policy and procedures. Literature searched various databases, including PubMed, Medline, and Google Scholar. The search period is from the 1960s until 06 December 2023. The term is in full-text English and includes Case Reports, Classical Articles, Clinical Conferences, Clinical Studies, Clinical Trials, Evaluation Studies, Government Publications, Guidelines, meta-analyses, Observational Studies, Practice Guidelines, Randomized Controlled Trials, Reviews, Systematic Reviews, with Humans subject. All hospital or community pharmacy services are included in a search term. Besides, the National and international guidelines of general occupational safety and health in hospital practice. The committee of pharmacy occupational safety and health policy and procedures formulated and consisted of various expert members. The policy included fire prevention, Emergency Plans, Fire Protection, Safety conditions, and requirements for the pharmacy buildings and medication stores. **Results:** The fire safety of pharmacy practice policy and procedures in pharmacy practice had various benefits, such as fire safety risk assessment, Usage of fire extinguishers type per each fire at each section of pharmacy services, illustrate the fire safety equipment requirement for pharmaceutical warehouse and pharmacy buildings, and instruction prevention of fire and during fire incident. **Conclusion:** Fire safety as part of occupational safety and health policy and procedures in pharmacy practice is a new initiative in Saudi Arabia. They will improve the pharmacy safety measurement and better occupational safety and health. In addition, it encourages pharmacy staff to adhere to local and international occupational safety and health regulations and standards. Therefore, The pharmacy occupational safety and health emphasis on fire safety highly recommended policies, procedures, and related risk assessment analysis in the pharmacy businesses in Saudi Arabia.

Keywords: Fire, Occupational safety, Pharmacy, Policy, Saudi Arabia.

INTRODUCTION

The pharmacy care services foundation had various building areas and sections.^[1-4] At each location, there are multiple facilities for offices and furniture. Besides, the central pharmacy area had many medicines and chemicals, such as alcohol or sanitizers.^[1] All those chemical materials are flammable, and the pharmacy services foundation should be considered. The code red building of fire safety by civil devices must be implemented at all pharmacy service locations.^[5-8] Various elements of fire safety in the pharmacy practice include storing flammable materials, electrical safety, fire extinguishers, emergency evacuation plans, fire alarm and sprinkler systems, smoking session policies, pharmacy staff training, and surveillance and compliance.^[5,7-9] It is rare to find fire safety as part of occupational safety and health in pharmacy practice researched or published.^[10-13] The annual health insurance report of occupational safety and healthcare incidents discussed the number of fire incidents.^[14] The report discussed is generally not specific to any healthcare organization. The authors are unfamiliar with any literature discussing fire safety in a particular pharmacy.

The current topic explores the occupational safety emphasis of fire safety policy and procedures in pharmacy practice.

METHODS

It is a narrative review of pharmacy occupational health and safety. The literature search was performed using PubMed, Medline, and Google Scholar databases about specific pharmacy practice accounting and financial system topics. The search period was from the 1960s until 06 December 2023. The searched terms were in full-text English. They included Full text, Case Reports, Classical Articles, Clinical Conferences, Clinical Studies, Clinical Trials, Evaluation Studies, Government Publications, Guidelines, meta-analyses, Observational Studies, Practice Guidelines, Randomized Controlled Trials, Reviews, Systematic Reviews, Humans, in the English language. The pharmacy services included inpatient, outpatient, or ambulatory care pharmacy, satellite pharmacy, extemporaneous preparation, repackaging units, pharmacy store, drug information center, and clinical pharmacy services. Moreover, the national and international guidelines of general pharmacy occupational

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health and safety practices emphasizing pharmacy and healthcare settings were used to guide the review.^[10,15-30] That includes guidelines from the Ministry of Building,^[6] the Ministry of Human Resources and Social Development,^[31] the Ministry of Interior (Civil of Defense),^[10,32-34] General Organization for Social Insurance,^[14,35] The Ministry of Labor (USA), National Fire Protection Association (USA),^[5,8,12,36-38] Occupational Safety and Health Administration (USA),^[17,39-41] The National Institute for Occupational Safety and Health (USA), and the Institution of Occupational Safety and Health (UK). Besides some local and international quality management standards from CBAHI and Joint Commission with emphasis on Facility and Management Safety (FMS),^[19,42] Pharmacy occupational health and safety.^[5,7,15-17,31,43-46] The pharmacy occupational health and safety committee comprises experts, clinical pharmacists, occupational safety specialists, and fire safety experts. The clinical pharmacist had taken more than ten national and international education courses about occupational safety and health. Some authors drafted the policy guidelines, and the other authors reviewed them. The occupational safety and health specialist and fire safety revised the draft. The policy included the fire safety risk assessment, Usage of fire extinguishers, the fire safety equipment requirement for pharmaceutical warehouse and pharmacy buildings, and instruction prevention of fire and during fire incidents. The Standards for Reporting Qualitative Research guided the reporting of the results of this review.^[47]

The search term methodology was done as follows:

Search: (pharmacy[Title/Abstract]) AND (occupational safety[Title/Abstract]) Filters: **Full text, Case Reports, Classical Article, Clinical Conference, Clinical Study, Clinical Trial, Evaluation Study, Government Publication, Guideline, Meta-Analysis, Observational Study, Practice Guideline, Randomized Controlled Trial, Review, Systematic Review, Humans, English**

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Search: (pharmacy[MeSH Terms]) AND (occupational safety[MeSH Terms]) Filters: **Full text, Case Reports, Classical Article, Clinical Conference, Clinical Study, Clinical Trial, Evaluation Study, Government Publication, Guideline, Meta-Analysis, Observational Study, Practice Guideline, Randomized Controlled Trial, Review, Systematic Review, Humans, English**

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Translations

pharmacy[MeSH Terms]: "pharmacy"[MeSH Terms] OR "pharmacies"[MeSH Terms]

occupational safety[MeSH Terms]: "occupational health"[MeSH Terms]

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occupational safety[MeSH Terms]:
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occupational safety[MeSH Terms]:
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Clinical Trial, Evaluation Study, Government Publication, Guideline, Meta-Analysis, Observational Study, Practice Guideline, Randomized Controlled Trial, Review, Systematic Review, Humans, English

(“pharmaceutical preparations”[MeSH Terms] AND “occupational health”[MeSH Terms]) AND ((casereports[Filter] OR classicalarticle[Filter] OR clinicalconference[Filter] OR clinicalstudy[Filter] OR clinicaltrial[Filter] OR evaluationstudy[Filter] OR governmentpublication[Filter] OR guideline[Filter] OR meta-analysis[Filter] OR observationalstudy[Filter] OR practiceguideline[Filter] OR randomizedcontrolledtrial[Filter] OR review[Filter] OR systematicreview[Filter]) AND (fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Translations

pharmaceutical[MeSH Terms]:
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occupational safety[MeSH Terms]:
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Search: (**PHARMACY**[Title/Abstract]) AND (**fire**[Title/Abstract]) Filters: **Full text, Case Reports, Classical Article, Clinical Conference, Clinical Study, Clinical Trial, Evaluation Study, Government Publication, Guideline, Meta-Analysis, Observational Study, Practice Guideline, Randomized Controlled Trial, Review, Systematic Review, Humans, English**

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fire[MeSH Terms]: “fires”[MeSH Terms]

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Translations

pharmaceutical care[MeSH Terms]: “pharmaceutical services”[MeSH Terms]

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RESULTS AND DISCUSSION

Reasons for Fire accidents

There are various Causes of fire: Personal, for instance, smoking, human errors, action mistakes, wrong decisions, low knowledge, or little experience. Material, for example, misdealing with toxins, flammable materials, or carcinogens. For instance, equipment used expired equipment without safety precautions or unsuitable or inappropriate equipment. Environment, for example, is present in dirty, dusty, and crowded places. Besides, Operations reasons, for instance, wrong policies and procedures, wrong design of work, and Production process which incused crowd production, used unsafe active ingredients. Arson, such as willfully and deliberately setting fire to or changing property.

Fire prevention

Risk Assessments

A Risk Assessment of each trust pharmacy/ drug store will be carried out at least annually. A suitably qualified and competent person will conduct a Risk Assessment and will:

- ✓ Identify potential hazards.
- ✓ Identify any persons at risk.
- ✓ Evaluate the risk and implement measures to remove, reduce, or control the risk to an acceptable level.
- ✓ All identified safety risks will be documented, systematically analyzed, and prioritized for action as necessary.
- ✓ All relevant staff should receive information on control measures, including policies, procedures, and protocols to minimize risk, and where appropriate, staff training is to be undertaken to reduce knowledge gaps.
- ✓ The Risk Assessment will be in writing and made available to Authorized Inspectors on request.
- ✓ The Fire Risk Assessment will be regularly reviewed and revised if significant changes to the premises, procedures, processes, equipment, or room use lead to new or increased hazards, invalidating the original assessment.

Safety equipment testing

At all pharmacies or drug stores, a record is to be maintained of safety equipment tests and checks, which should incorporate the following:

Make trial tests and maintain fire alarm and detection systems, emergency lighting, and fire-fighting equipment. Document the date of the test or maintenance and who carried these out. Record the details of defects and action taken, besides the date defects were rectified and by whom.

Emergency Plans and Procedures

- ✓ Suitable emergency plans and procedures must be provided for each pharmacy/drug store site. The plans are to be prepared concerning the premises Risk Assessment and set out, amongst other things, details of the action to be taken with persons in case of emergency, the procedure of evacuation, and the arrangements for calling the civil defense and informing them of any unique risks.
- ✓ The plans must identify those persons who are responsible for supervising the plans and the entities and carrying out emergency plan drills.
- ✓ When carrying out any emergency evacuation plans, pay attention to the needs of any individual who may suffer physical or sensory disability.
- ✓ Methods and equipment should be made available for the safe evacuation of occupants of the pharmacy or drug stores.
- ✓ Fire action notices complementing the emergency evacuation plans will be prominently displayed in critical locations such as fire alarm call points and staff rooms.
- ✓ The principal points to be included in the fire action notice are the actions to be taken upon discovering a fire and hearing the alarm; these should be adapted or extended to suit an individual site.
- ✓ Methods must be employed to ensure the safe evacuation of all persons without reliance on the assistance of the civil defense.

Fire Protection

The pharmacist should use the following elements to prevent a fire inside or around the pharmacy building.

- ✓ The pharmacist should follow the guidelines and regulations of civil defense, Saudi Building Code 201, Saudi Building Code 801, Saudi Buildings Code 1102, national fire protection for fire protection and emergency evacuation plans for fire occurrences during storage of medications or medical supplies, transport, until the distribution of medicine.
- ✓ Make an Analysis of risk to predict all expected risks related to fire incidence and how to avoid them.
- ✓ Used the Fire alarm: through implemented sprinkles and warning wrinkles.
- ✓ Make Fire audit: through regular inspection of the fire protection equipment and process, inspection of equipment before operations such as fire extinguisher.

- ✓ Please share in the Fire investigation that is related to collecting the reasons for the fire to be removed before it occurred.
- ✓ Report review through the regular safety report and key performance indicators to review the strengths points and weaknesses points of fire protection to resolve.
- ✓ Update the Strategic planning by analyzing the policy and process and related successful or failed fire protection operations.

Fire types

There are various types of fire, as follows.

- ✓ Type A: Fire is from sold materials such as wood, paper, cloth, and plastic. The pharmacist can use fire extinguishers, water or form or drug powder (ABC).
- ✓ Type B: The fire is from a flammable liquid or gas material such as benzene, kerosene, or alcohol. The pharmacist can form CO₂ and dry powder. It should not use a water fire extinguisher that will increase the amount of fire and distribute the fire.
- ✓ Type C: The fire from electrical equipment, and the pharmacist might use dry powder or CO₂ fire extinguisher. It should not use water or form fire that will increase the electrical activity shock to the pharmacist.
- ✓ Type D: The fire from chemical substances such as sodium, potassium, and magnesium. The pharmacist should use a special fire extinguisher for those substances.
- ✓ Type K: The pharmacist can use a blanket cover or net chemical fire extinguishers for the fire from cooking oil.

General Policy of Fire Safety

- ✓ The person responsible for safety is obligated to allocate a file called (the Fire Safety file) according to the form prepared by the Civil Defense, the pages of which shall be stamped with the Civil Defense seal, and it shall be allocated to record the results of the monthly examinations and periodic tests of the means and equipment of fire-fighting, surveillance and alarm, their dates and the entities. And the list, its results, repair processes, and other data. In addition, a portion of the file is also allocated for inspections and maintenance of the building and electrical installations.
- ✓ When any accident or accident occurs that involves a high degree of danger, the safety official is obligated to attempt to isolate or stop the source of danger immediately, evacuate workers from dangerous places in the building, and inform the specialized civil defense center immediately to consider the action that must be taken.

- ✓ Workers in drug stores must be trained in fire-fighting, first aid, and rescue in schools and national training institutes accredited by the General Directorate of Civil Defense so that the requesting facility endures the cost of the trainees and, in all cases, the number of workers and their nationalities must be proven.
- ✓ The person responsible for safety must conduct monthly inspections and tests on safety means for the safety of fire-fighting and alarm equipment and repair any malfunction as soon as it occurs. The competent civil defense center may be notified at a suitable time for the civil defense representative to be present during the test; the defense representative's signature in the civilian safety record proves this.
- ✓ In the Civil Defense System, it is not permissible to license any new, renew, restore, or expand existing drug warehouses before the license applicant carries out a technical study prepared by a technical office specializing in safety work, alarm devices, and fire-fighting.
- ✓ Approved by the General Directorate of Civil Defense, it clarifies the extent of compliance with the rules contained in this regulation. It gives pharmaceutical warehouses existing at the time of issuance of the regulation one year to implement the requirements and instructions contained in this regulation.
- ✓ The office that prepared the study, as mentioned above, shall be responsible in front of the Civil Defense and other relevant authorities for the seriousness and accuracy of the research and for monitoring its implementation. It shall also be obligated to submit a final certificate confirming that the drug warehouses comply with the instructions and requirements contained in these regulations. It shall also be jointly responsible for any error or negligence with the warehouse's entity.
- ✓ Violations of this regulation shall be detected and investigated, and punishment shall be imposed following what is included in the Civil Defense System and the rules or instructions issued by the Civil Defense that regulate these matters.

Safety conditions and requirements:

Location and construction

- ✓ The location of the pharmacy or drug store must meet the requirements of the relevant official authorities in the Ministry of Health, municipalities, and others.
- ✓ The building must be made of non-combustible materials and resist fire for no less than (2 hr).

- ✓ It is not allowed to establish pharmacies and warehouses underground (basement), within gas stations, or near dangerous places (welding workshops, laboratories, and stores of chemical and radioactive materials).
- ✓ The area of the drug warehouse must be at most 1000 m².

Electrical installations and equipment

- ✓ A specialized technical authority must carry out electrical installations and extensions, and all electrical equipment must comply with the Saudi Arabian Standards and Metrology Organization.
- ✓ Electrical extensions and installations must be carried out within protective pipes; exposed extensions are unacceptable.
- ✓ A backup lighting source must be provided in pharmaceutical warehouses with an independent supply that is compatible with the nature of the facility so that it is sufficient for lighting for at least 2 hr in emergencies.
- ✓ All electrical devices and installations must have ground connections (grounding).
- ✓ The new electrical equipment and installations in the warehouse or pharmacy must be thoroughly examined and tested regularly when they are first put into service. Then, specialized technicians carry out the necessary maintenance on them regularly.
- ✓ Switches and sub-distribution panels must be placed in prominent and accessible places.
- ✓ The main switch and main distribution panel must be placed in a suitable place, which must:
 - ✓ It should be near the main entrance.
 - ✓ Distinctive and instructions signs should be placed to indicate the location of the main and sub-keys, clarifying their scope and use.
- ✓ If there are illuminated panels on the facades and surfaces, they must be provided with an electrical circuit breaker installed in the appropriate place and covered with a glass panel.
- ✓ Install a lightning rod (according to what Civil Defense deems appropriate).
- ✓ Carrying out periodic maintenance for all extensions, connections, and electrical appliances, provided that this is done by a specialized technical authority authorized in this field.

Ventilation and air conditioning systems

- ✓ When choosing the locations of the external air intakes for the air conditioner, avoid

being adjacent to places or sources at risk of fire.

- ✓ The main ducts of the air conditioner must pass through vertical or horizontal corridors made of non-combustible materials as a fire-retardant unit, with appropriate openings with fire-retardant doors to facilitate maintenance procedures.
- ✓ When the air conditioning ducts for fire-retardant walls and ceilings in a building burn, their resistance to fire must be at the same degree as that of the walls, and they must be closed with materials that have the same fire resistance as the walls and ceilings.
- ✓ The ducts of the central ventilation and air conditioning system must be equipped with smoke detectors that automatically turn off the entire device when smoke is detected and, at the same time, operate suction fans to expel the smoke outside.
- ✓ The insulating materials used to cover the air ducts inside and outside must be non-combustible. They provided natural and mechanical ventilation to ensure air renewal and no fumes, gases, or dust accumulation.
- ✓ The temperature of this location should not exceed (25) degrees Celsius, and a thermometer should be placed to measure the temperature continuously.
- ✓ Periodic maintenance of all air conditioning devices must be carried out by a specialized technical authority authorized in this field.

Preventive Safety Instructions

1. Adherence to what is stated in the executive regulations for the Pharmacy Profession Practice Law issued by Royal Decree No. (M/18) on (2/18/1398 AH).

Fire-fighting means:

For the pharmacy

- ✓ The pharmacy is provided with the necessary number of manual fire extinguishers at a rate of one dry chemical powder extinguisher (12 kg) per (50 m), with a minimum number of (2) dry chemical powder extinguisher (12 kg) for each pharmacy, regardless of its small area.
- ✓ The pharmacy has an early fire detection device connected to red or blue external lighting and an external alarm bell that works when a fire occurs.

For drug stores

- ✓ Warehouses must be equipped with appropriate manual fire extinguishers following the rates and minimums mentioned above.
- ✓ The warehouse shall be equipped with an automatic fire-fighting sprinkler network

- system, and an external nozzle network shall also be available (not less than two nozzles).
- ✓ The warehouse is equipped with automatic and manual alarm systems.
 - ✓ Suitable water tanks must be provided to implement paragraphs (b, c).
 - ✓ The authorities responsible for the site (pharmaceutical warehouse) must submit a technical study that includes a complete plan for safety and fire-fighting equipment and equipment to the competent civil defense department for review and approval of the appropriate equipment after inspecting the site.
 - ✓ The manual fire extinguisher shall be under the specifications issued by the Saudi Arabian Standards and Metrology Organization.
 - ✓ Fire extinguishers are placed or hung in precise places and close to doors and exits, making them easy to reach and use when necessary.
 - ✓ Each extinguisher must carry operating instructions and the last filling and maintenance date.

Means of survival

For pharmacies

The necessary means of egress must be available, according to the area of the pharmacy, to ensure its evacuation within a period of (three minutes) in the event of an emergency (such as a fire, for example, God forbid).

For drug stores

- ✓ It implements the instructions in the storage warehouse regulations issued by His Royal Highness, Minister of Interior, and Chairman of the Civil Defense Council.
- ✓ It is not permissible to place or install any furniture, barriers, equipment, or anything that would reduce the width of the escape exits or hinder its use.
- ✓ The escape exit always remains usable to perform to the maximum of its capacity, and it is prohibited to be used for any purpose other than the purpose it was designed for.
- ✓ The escape exit may not be covered with combustible material or material that may cause slipping or tripping.
- ✓ The net height of escape routes (emergency exits) must not be less than (2.2) m, and the width must not be less than (1.5) m.
- ✓ The walls, floors, and ceilings of escape routes must be of the same
- ✓ resistance as the building's walls and columns.

- ✓ The number of emergency exits must be at least (two exits).
- ✓ The approval of the Civil Defense on the suitability of the means of survival for the sites shall be obtained after presenting the plans to it.

Additional requirements for pharmaceutical warehouses

In addition to the previous conditions, the following requirements must be observed regarding drug warehouses.

- ✓ The warehouse must have all the safety requirements and conditions per what is included in the list of safety conditions in storage warehouses issued by the Civil Defense, taking into account following the specific storage method and preventing the mixing of reactive materials and that the materials are classified and stored under the supervision of specialized chemists.
- ✓ The potential risks in the warehouse must provide the necessary first aid materials.
- ✓ Carrying out any medical or chemical formulations inside warehouses is strictly prohibited. These facilities are designated to receive pharmaceutical containers and store them in preparation for distribution.
- ✓ The warehouse storage area should be divided into a receiving and delivery area, a storage area with suitable shelves, and an isolated area for damaged and expired returns in the warehouse or pharmacy.
- ✓ Administration offices (and services), bathrooms, and places attached to the warehouse must be separate from the storage area.

CONCLUSION

Fire safety as part of occupational safety and health policy and procedures in pharmacy practice is a new initiative in the overall performance of pharmacy safety measurements. It significantly improves the pharmacy occupational health plan, emphasizing safety management. The pharmacist should be aware of and implement the fire safety risk assessment, the Usage of fire extinguishers, the fire safety equipment requirement for pharmaceutical warehouses and pharmacy buildings, and instruction in fire prevention and during fire incidents. The occupational safety and health emphasis on the fire safety pharmaceutical care services policy and procedures are highly required for implementation and during pharmacy operations in Saudi Arabia.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Consent for Publications

Informed consent was obtained from all the participants.

Ethical Approval


This research is exempted from research and ethical committee or an Institutional Review Board (IRB) Approval.

<https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2018/index.html>

ABBREVIATIONS

MOH: Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **ASHP:** American Society of Health-System Pharmacists; **CBAHI:** Saudi Central Board for Accreditation of Healthcare Institutions; **FMS:** Facility and Management Safety; **NFA:** National Fire Protection Association; **OSHA:** Occupational Safety and Health Administration; **NIOSH:** The National Institute for Occupational Safety and Health; **IOSH:** The Institution of Occupational Safety and Health.

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REFERENCES

1. Alomi YA, Shorog E, Alshahrani A, Alasmay S, Alenazi H, Almutairi A, et al. National Survey of Pharmacy Practice at MOH Hospitals in Saudi Arabia 2016-2017: Preparation of Medications and Dispensing. *Journal of Pharmacy Practice and Community Medicine*. 2018;4(1s):s47-s53. doi: 10.5530/jppcm.2018.1s.19.
2. Alomi YA, Shorog E, Alshahrani A, Alasmay S, Alenazi H, Almutairi A, et al. National Survey of Pharmacy Practice at MOH Hospitals in Saudi Arabia 2016-2017: Drug Monitoring and Patients Education. *Journal of Pharmacy Practice and Community Medicine*. 2018;4(1s):s17-s22. doi: 10.5530/jppcm.2018.1s.14.
3. Alomi YA, Alghamdi SJ, Alattiyh RA. National Survey of Pharmacy Practice at MOH Hospitals in Saudi Arabia 2016-2017: Pharmacy Inventory Control and Stock Management. *Journal of Pharmacy Practice and Community Medicine*. 2018;4(1s):s28-s33. doi: 10.5530/jppcm.2018.1s.16.
4. ASHP. ASHP guideline: minimum standard for pharmaceutical services in ambulatory care. *American Journal of health-system Pharmacy*. 1999;56(17):1744-53. Epub 1999/10/08. doi: 10.1093/ajhp/56.17.1744. PubMed PMID: 10512507.
5. William E. Koffel GEH, Kenneth E. Bush, Stanley C. Harbuck. *Life Safety Code (NFPA 101)*. National Fire Protection Association, 2018.
6. Baethge C, Goldbeck-Wood S, Mertens S.

- SANRA-a scale for the quality assessment of narrative review articles. *Res Integr Peer Rev.* 2019;4:5. Epub 2019/04/10. doi: 10.1186/s41073-019-0064-8. PubMed PMID: 30962953; PubMed Central PMCID: PMC6434870.
7. Fire Protection Code - Saudi Building Code 801 A. Saudi Building Code National Committee, Ministry of Building 2018.
 8. Flammable and Combustible Liquids Code 30. National Fire Protection Association, 2018.
 9. National Electrical Code. National Fire Protection Association, 2017.
 10. Effect of Managed Care Pharmacy Tools An Annotated Bibliography Abt Associates Inc.
 11. Van Dusan V. "Safe" considerations: burglary- and fire-resistant devices for the pharmacy. *J Am Pharm Assoc (Wash).* 2002;42(4):552-5. Epub 2002/08/02. doi: 10.1331/108658002763029517. PubMed PMID: 12150352.
 12. Thompson CA. Fire fails to deter outpatient pharmacy's staff from serving patients. *American journal of health-system pharmacy : AJHP : official journal of the American Society of Health-System Pharmacists.* 2018;75(12):841-2. Epub 2018/06/09. doi: 10.2146/news180039. PubMed PMID: 29880514.
 13. Greeson NMH, Mixon W, Allan WC. Safety Standards in Pharmaceutical Compounding, Part 1: The Occupational Safety and Health Administration. *Int J Pharm Compd.* 2020;24(4):270-6. Epub 2020/07/11. PubMed PMID: 32649298.
 14. Statistics Report. General Organization of Social Insurance, 2020.
 15. ISO. Occupational health and safety management systems – Requirements with guidance for use. 2018.
 16. Rooij PV. Occupational Safety and Health Management System. International Labour Organization, 2016.
 17. Recommended Practices for Safety and Health Programs. Occupational Safety and Health Administration, 2016.
 18. Alsakkak MA, Alwahabi SA, Alsalhi HM, Shugdar MA. Outcome of the first Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) primary health care accreditation cycle in Saudi Arabia. *Saudi medical journal.* 2017;38(11):1132-6. Epub 2017/11/09. doi: 10.15537/smj.2017.11.20760. PubMed PMID: 29114702; PubMed Central PMCID: PMC65767617.
 19. National Hospital Standards. Third Edition ed: Saudi Central Board for Accreditation of Healthcare Institutions.; 2015.
 20. Bowles GC, Jr. Modern pharmacy practice: more controls mean more recordkeeping and security. *Mod Hosp.* 1973;121(4):116-7. Epub 1973/10/01. PubMed PMID: 4786771.
 21. Boxerbaum EA, Moore TD. Self-assessment checklist for evaluating the security of a hospital pharmacy. *American journal of hospital pharmacy.* 1981;38(12):1953-5. Epub 1981/12/01. PubMed PMID: 7325181.
 22. Soukup BJ. The drug quality and security act: how will it change pharmacy? *Consult Pharm.* 2014;29(5):352. Epub 2014/09/10. doi: 10.4140/TCPn.2014.352. PubMed PMID: 25203978.
 23. Tribble D. Ideas for action: hospital pharmacy security. *Top Hosp Pharm Manage.* 1984;4(2):52-74. Epub 1984/07/09. PubMed PMID: 10314086.
 24. Williams J, Feild C, James K. The effects of a social media policy on pharmacy students' facebook security settings. *American journal of pharmaceutical education.* 2011;75(9):177. Epub 2011/12/16. doi: 10.5688/ajpe759177. PubMed PMID: 22171105; PubMed Central PMCID: PMC3230338.
 25. Young DW. Security for the community pharmacy. *Am J Pharm Sci Support Public Health.* 1974;146(1):15-21. Epub 1974/01/01. PubMed PMID: 4822360.
 26. TARHAN N. Digital Data Security Awareness: A Study with Pharmacy Students. *FABAD J Pharm Sci.* 2022;47(2):193-200.
 27. Jaithliya T. Cyber Security in Pharmacy and Pharmaceutical Companies. *Jaithliya T J Pharma Pharma Sci.* 2017(5):1-4. doi: 10.29011/2574-7711/100021.
 28. Liesoja J. Cyber security risk management method for hospital pharmacy, Pharmaceutical service operations: JAMK University of Applied Sciences; 2023.
 29. Lenell AN. Pharmacy Security: A Survey on Pharmacists' Perceptions and Preparedness to Handle Prescription Fraud and Pharmacy Robbery: Butler University; 2007.
 30. Çalıř S, Büyükakıncı BY. Occupational Health and Safety Management Systems Applications and A System Planning Model. *Procedia Computer Science.* 2019;158:1058-66. doi: 10.1016/j.procs.2019.09.147.
 31. Implement risk management and safety culture. Occupational Safety and Health - Ministry of Human Resources and Social Development, 2017.
 32. National Planning of Chemical and Biological Crises. Civil Defence Council. Ministry of Interior. Saudi Arabia, 2006.
 33. National Planning of Natural Crises and Disaster. Civil Defence Council. Ministry of Interior. Saudi Arabia, 2006.
 34. Guide regulation for healthcae and Social Buildings Group (1). Civil of Defence Ministry, 2022.
 35. Occupational Diseases List. Genaerl Organization for Social Insurance, 2009.
 36. Risk management – Risk assessment techniques. The International Electrotechnical Commission, 2019.
 37. Installation of Sprinkler Systems. National Fire Protection Association, 2019.
 38. Standard for Commissioning of Fire Protection and Life Safety Systems. National Fire Protection Association, 2021.
 39. Materials Handling and Storage. Occupational Safety and Health Administration U.S. Department of Labor, 2002.
 40. Hazard Classification Guidance for Manufacturers, Importers, and Employers. Occupational Safety and Health Administration U.S. Department of Labor, 2916.
 41. nspection Procedures for the Hazard Communication Standard. Occupational Safety and Health Administration U.S. Department of Labor, 2015.
 42. Joint Commission International A ccreditation standards for Primary Care. Joint Commission international, 2018.
 43. Wada M. Strengthening the Kawa model: Japanese perspectives on person, occupation, and environment. *Can J Occup Ther.* 2011;78(4):230-6. doi: 10.2182/cjot.2011.78.4.4. PubMed PMID: 22043554.
 44. Safety and Occupational Health Law. Ministry of Resources and Social Development, 2017.
 45. Procedural Guidelines for Occupational Safety and Health for preventing the Effects of Exposure to The Direct Sun and Heat Stress. National Council for Occupational Safety and Health for, 2021.
 46. Health OSa. Personal Protective Equipment. 2023.
 47. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med.* 2014;89(9):1245-51. doi: 10.1097/ACM.0000000000000388. PubMed PMID: 24979285.