

# Pharmacy Infection Control: Staff Immunization and Occupational Infections

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## ABSTRACT

**Objectives:** This study aimed to declare pharmacy infection control concerning the staff immunization and occupational infections policy as a new initiative in Saudi Arabia. **Methods:** This is a narrative review of pharmacy infection control. The literature search was performed using various databases, including PubMed, Medline, and Google Scholar, about specific topics related to infection control in pharmacy practice. The search period was from the 1960s to October 2021. The terms searched were in English and included narrative review, systemic review, meta-analysis, and guidelines. The terms "Policies" and "Procedures" were limited to the last 10 years across all hospitals, and community pharmacy services were included in the search terms. The committee of pharmacy infection control consisted of various expert members, including clinical pharmacists, community pharmacists, and infection control specialists. The first members drafted the policy. The second members reviewed the draft policy and corrected it. Finally, the third members, an infection control specialist, revised the draft. The topic emphasizes staff immunization policies and procedures and occupational safety for pharmacy infection control. **Results:** The staff immunization and occupational safety policy of pharmacy infection control consisted of various items, and it included instructions for adult's vaccines for pharmacy staff and interns, the adult's vaccines needed for a particular condition, immunization for occupational infections, and work restriction for infected pharmacy personal. **Conclusion:** The policies and procedures related to staff immunization and occupational safety are new initiatives in pharmacy practice. It is an active measurement for preventing various infectious diseases among pharmacy personnel. Therefore, staff immunization and safety related to occupational infections policy is the foundation of pharmacy human resources in Saudi Arabia.

**Keywords:** Pharmacy, Infection control, Staff, Immunization, Occupational infections, Occupational safety, Saudi Arabia.

## INTRODUCTION

Over the years, the immunization and vaccination services for pediatrics and adults have been successfully established, which has significantly reduced the rates of morbidity and mortality.<sup>1-3</sup> However, occupational infections are one of the biggest concerns for healthcare workers. The common infections related to occupation infection are "...tuberculosis (TB), hepatitis B & C, HIV/AIDS and respiratory infections (coronaviruses, influenza)".<sup>4</sup> World Health Organization reported that approximately 5.3% of healthcare workers are infected with acute hepatitis B infection. Mentionable here is that needlestick injuries are common among healthcare workers too, accounting for hepatitis C (39%), hepatitis B (37%) and HIV infections (4.4%).<sup>4</sup> The pharmacist plays an active role in running a program on immunization and vaccination for the pediatric and adult population.<sup>5-7</sup> Immunization programs are also run for various healthcare workers and immunocompromised patients.<sup>1-3</sup> All healthcare workers and pharmacists should follow the national and international guidelines on immunization and vaccination programs.<sup>1-3</sup> The vaccination of pharmacy staff should be started on internship pharmacy training, followed by any level of pharmacy job to protect from occupational infections and injuries during working.<sup>8</sup> This measure keeps the pharmacy staff

immunized and prevents disease transmission. Health-care workers, including pharmacists, are at high risk of exposure to various infectious diseases, which may increase the transmission of infection in the hospital environment.<sup>8</sup> The transmission of infection can be reduced by following the three necessary steps for the prevention of infection, including hand hygiene, isolation, and immunoprophylaxis. Moreover, screening workers, providing education, and engaging in the management of employee exposure to infectious agents play an essential role in an effective infection control program.<sup>9-11</sup> Various guidelines have been set forth for the employment vaccination and occupational safety.<sup>8,12-16</sup> However, most of the guidelines for all healthcare professionals emphasize physicians and nurses.<sup>8</sup> Some studies have shown that healthcare workers, including pharmacists and students, need more training on awareness of immunization and training to avoid needlestick/ sharp injuries.<sup>17-24</sup> The clinical and economic burden of needlestick/ sharp injuries at healthcare organizations was another concerning healthcare worker vaccinations.<sup>25-26</sup> Studies on pharmacy staff immunization and pharmacy infection control occupational safety are hard to find.<sup>21-23,27</sup> However, most investigations have discussed general pharmacy occupational safety.<sup>28-31</sup>

Therefore, this review aims to declare pharmacist immunization and occupational safety in pharmacy practice in Saudi Arabia.

## MATERIALS AND METHODS

This is a narrative review of pharmacy infection control. Literature specific to topics related to infection control in pharmacy practice was searched in various databases, including PubMed, Medline, and Google Scholar. The search period was from the 1960s until October 2021, and the search terms were in English, including narrative review, systemic review, meta-analysis, and guidelines. The date was limited to the last 10 years only with "Policies" and "Procedures" terms. All hospitals or community pharmacies were included in the search terms. The pharmacy services included inpatient pharmacy, outpatient or ambulatory care pharmacy, satellite pharmacy, extemporaneous preparation, repackaging units, pharmacy store, drug information center, and clinical pharmacy services. The national and international guidelines of infection control in hospital practice as general guiding of pharmacy infection control emphasize occupational safety and pharmacy staff vaccinations.<sup>32-33</sup> The guidelines include the Centers for Disease Control and Prevention (CDC) of the United States of America, the Saudi Center for Diseases Control (SCDC), the American Society of Health-System Pharmacist (ASHP), the World Health Organization (WHO), and the United States Pharmacopeia (USP).<sup>8,12-16,34-37</sup> The committee responsible for pharmacy infection control at hospitals must formulate guidelines for preventing the transmission of infection. The committee consisted of expert reviewers, including clinical pharmacists, community pharmacists, and infection control specialists. Some authors drafted the guidelines of the policy, and other authors reviewed and corrected them, whereas the additional authors, who were infection control specialists, revised it. The document consisted of various topics, including environmental and workplace safety, staff immunization and occupational safety, pharmacy basic hygiene, quality of pharmacy infection control, competency of pharmacy infection control, and education and training of pharmacy infection control. The current review will explore occupational safety and pharmacy staff immunizations. The international Appraisal of Guidelines, Research, and Evaluation (AGREE) standard guided the reporting of the results of this study.<sup>38</sup>

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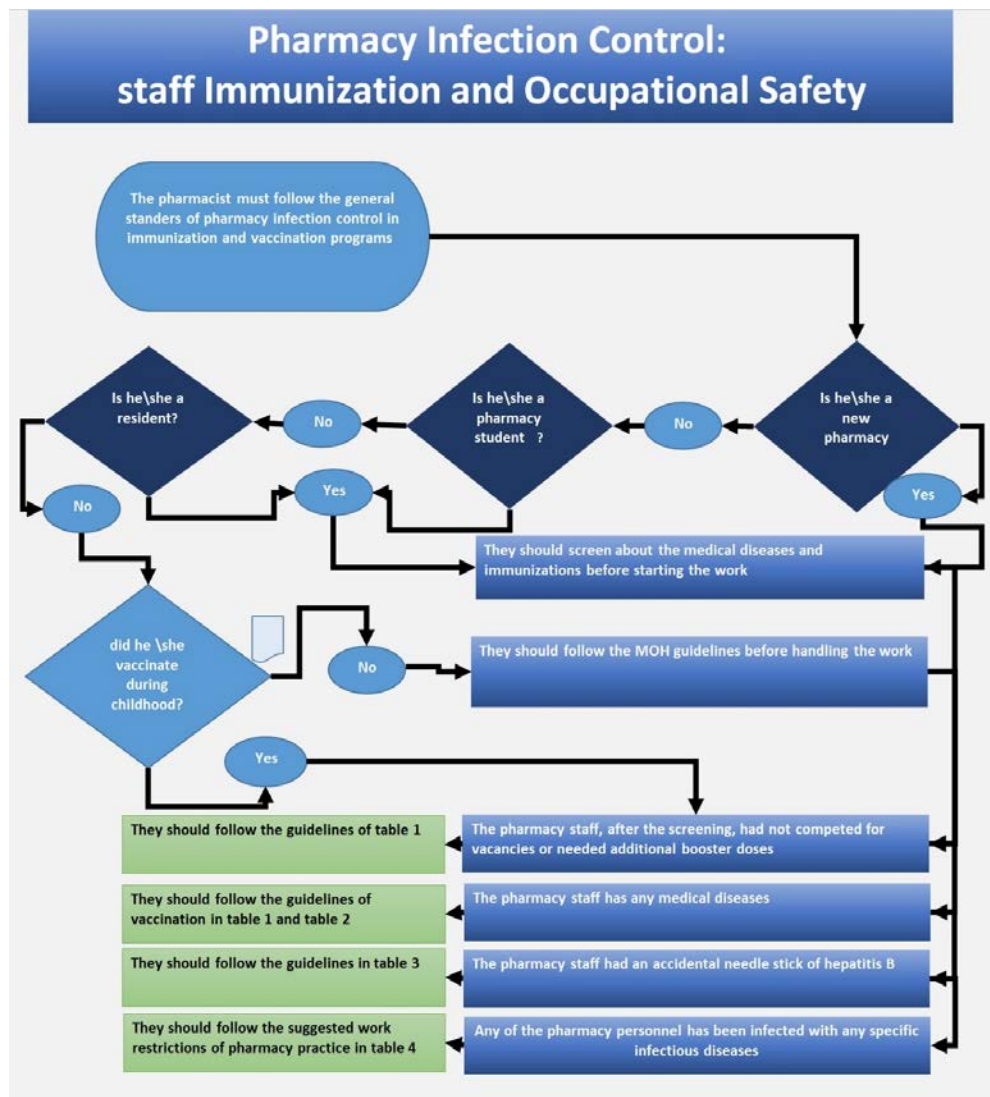
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**Figure1:** Staff immunization and occupational infection steps policy and procedures.

**Table 1: Finding of literature review**<sup>8,10,12-16,34-37,39-43</sup>

Vaccines recommended strongly for pharmacy workers

| Vaccine  | Series  | rout   | Schedule   | Booster  | Precautions/contra-indications  |
|--|---|--|--|--|---|
| Hepatitis B  | 3   | IM   | 0, 1, and six months repeat series if non-responder  | no booster   | Avoid if anaphylaxis to baker's yeast. Examined 1-2 months after completing the vaccination series to determine serologic response for those who have contact with blood and body fluids  |
| Influenza  | 1   | SubQ<br>IM   | Yearly   | -  | Anaphylaxis to eggs/avoids live vaccine if working with patients who have received stem cell Transplants. There was no confirmation of maternal or fetal risk when the vaccine was given to pregnant women with underlying situations. However, that presents them at high risk for severe influenza complications.   |
| MMR (Measles<br>Mumps<br>Rubella)  | 2   | SubQ   | 4 weeks apart  |  | Pregnancy (avoid getting pregnant for a minimum of one month after each shot.) / non-immunocompetent state/anaphylaxis to neomycin. Or gelatin/recent use of immunoglobulin<br>MMR is the vaccine of choice if recipients are also likely to be susceptible to rubella and/or mumps who vaccinated between 1963 and 1967 with a killed measles vaccine alone, a killed vaccine followed by a live vaccine, or a vaccine of unknown type should be revaccinated with 2 doses of the live measles vaccine |
| Meningococcal vaccine<br>(Meningococcal polysaccharides A, C, W135, and Y) | 1   | IM   |  | Every 5 years  | Use polysaccharide vaccine if healthcare workers >55 years<br>During performing or participating in Hajj and traveling to an area with disease or working in hospitals with high rates of exposure: laboratory healthcare professionals who frequently work with Neisseria meningitidis   |
| Pertussis<br>Tetanus-Diphtheria<br>Acellular<br>Pertussis(Tdap)            | 3   | IM   | 0,>4 weeks, and 6 to 12 months later. AT least 1 dose should be Tdap Preferably dose 1, with either Td or Tdap appropriate for doses 2 and 3 | Every 10 years   | Encephalopathy, Guillain-Barre syndrome <sixweeks after a dose of tetanus toxoid vaccine or progressive neurological disease. Age is not a contraindication among healthcare workers<br>Allergy or anaphylactic incident to gelatin and neomycin. Or any vaccine components following a prior dose.   |
| Tetanus, diphtheria<br>(Td)  |   |  |  |  |   |
| Hepatitis A  | 2   | IM   | at least 6 months apart  | -  | History of anaphylaxis to initial dose/use in pregnancy only if high risk of disease<br>Travel to an area with disease or work in hospitals with high rates of exposure   |
| Pneumococcal   | Use the Prevnar 13 conjugate vaccine in non-immunocompetent healthcare workers, followed by the pneumococcal polysaccharide vaccine 8 weeks later   | Use a single dose of polysaccharide vaccine if not immunocompromised |  | Use the Prevnar 13 conjugate vaccine for non-immunocompetent healthcare workers, followed by the pneumococcal polysaccharide vaccine 8 weeks later | Use a single dose of polysaccharide vaccine if not immunocompromised  |
| Pneumococcal   | Utilize the Prevnar 13 conjugate vaccine in immunocompromised healthcare workers, followed by the pneumococcal polysaccharide vaccine 8 weeks later |  |  |  | Use a single dose of polysaccharide vaccine if not immunocompromised  |

SubQ: subcutaneous IM: intramuscular MMR: Measles, Mumps, Rubella



**Table 2: Vaccines recommended in special circumstances**<sup>8,10,12-16,34-37,39-43</sup>

| Vaccine    | Series   | rout     | Schedule   | booster   | Precautions/contraindications   |
|------------|--|----------|--|---|---|
| Typhoid    | 1 IM or 4 PO                                     | IM, PO   | Days 1,3,5 and 7   | For 1 IM every 2 Years, 4 PO every 5 years  | Avoid oral vaccines in pregnancy and in immunocompromised. avoid oral vaccines in healthcare workers involved in direct patient care<br>WHEN  |
| Varicella  | 2  | SubQ     | 4 weeks apart  | -   | Travel to an area with disease or work in hospitals with high rates of exposure: laboratory workers who frequently work with Salmonella typhi<br>Pregnancy/immunocompromised state, anaphylaxis to neomycin. Or gelatin/avoid aspirin for six weeks beyond immunization/recent use of immunoglobulin<br>Avoid during pregnancy. Unless high risk and if anaphylaxis to streptomycin or neomycin<br>WHEN |
| Polio(IPV) | 1 if previously immunized; if unimmunized that 3 | IM, SubQ | the second 4-8 weeks after the first. And the last six to twelve months after the second | -   | Travel to an area with the disease. Or work in hospitals with high rates of exposure: laboratory workers who frequently work with specimens that may contain polioviruses<br>WHEN   |
| Rabies     |  |          |  | Pre-exposure :<br>IM 3 doses on days 0, 7, and 21 or 28.<br>Booster: based on antibody titers<br>Post-exposure:<br>Immunocompetent: IM 4 doses on days 0,3,7,14<br>Immunocompromised: IM 5 doses on days 0, 3, 7, 14, 28<br>WHEN<br>who take care of patients with rabies | Post-exposure prophylaxis should follow guidelines, including the use of rabies immunoglobulin  |

SubQ: subcutaneous IM: intramuscular PO: Oral administration

**Table 3: Post-exposure prophylaxis for hepatitis B**<sup>8,10,12-16,34-37,39-43</sup>

| healthcare worker's vaccination/serostatus | Source HBs- Antigen positive   | Source HBs- Antigen negative | Source unknown   |
|--|--|------------------------------|--|
| Unvaccinated                               | HBIG and initiate vaccination  | Vaccination alone            | Vaccination alone  |
| Responder to vaccine                       | No treatment   | No treatment                 | No treatment   |
| Non-responder after one series             | HBIG and reinitiate vaccination  | No treatment                 | If high-risk source: HBIG and revaccination  |
| Non-responder after two series             | HBIG was given twice, with the doses separated by one month                              | No treatment                 | HBIG was given twice with the doses separated by one month                               |
| Unknown response                           | Test for anti-HBs:<br>If ≥10 Miu/mL: no treatment<br>If <10 Miu/mL: HBIG and vaccination | No treatment                 | Test for anti-HBs:<br>If ≥10 Miu/mL: no treatment<br>If <10 Miu/mL: HBIG and vaccination |

Miu/mL: milli-international units per milliliter HBs: Hepatitis B HBIG: Hepatitis B immunoglobulin

**Table 4: Summary of suggested work restrictions for pharmacy personnel exposed to or infected with an infectious disease of importance in pharmacy settings.**<sup>8,10,12-16,34-37,39-43</sup>

| Diseases  | Work restriction   | Duration  |
|---|--|---|
| Diphtheria  | Exclude from duty  | Until antimicrobial therapy is completed and two cultures obtained >24 hr apart are negative            |
| Measles   | Exclude from duty  | Until seven days after the rash appears   |
| Meningococcal meningitis                                | Exclude from duty  | Until 24 hr after the start of antibiotic therapy   |
| Mumps   | Exclude from duty  | Until nine days after the onset of parotitis  |
| Pertussis   | Exclude from duty  | From the beginning of the catarrhal stage through the 3 <sup>rd</sup> week after the onset of paroxysms |
| Rubella   | Exclude from duty  | Until five days after the rash appears  |
| Tuberculosis  | Exclude from duty  | Until proven noninfectious by a physician   |
| Varicella   | Exclude from duty  | Until all lesions are dry and crusted over  |
| Zoster  | Restrict the pharmacy and patient contact  | Until all lesions are dry and crusted over  |
| Viral respiratory infections, acute febrile<br>Consider | Consider excluding from the care of high-risk patients ++ or from contact with their environment during community outbreaks of RSV and influenza | Until acute symptoms resolve  |
| Streptococcal group A infection                         | Restrict from patient care, contact with patients' environment, or food handling   | Until 24 hr after adequate antimicrobial therapy  |
| Staphylococcus aureus infection                         | Restrict from patient care, contact with patients' environment, or food handling   | Until lesions have resolved   |

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### RESULTS

The pharmacist must follow the general standards of pharmacy infection control in immunization and vaccination programs (Figure 1) as follows:

- All new pharmacy staff, pharmacy students, or residents should screen for medical diseases and immunizations before starting the work.
- If the pharmacy personnel did not obtain vaccination during their childhood, they should follow the Ministry of Health (MOH) guidelines before handling the work.
- If the pharmacy staff, after the screening, had not obtained vaccinations or needed additional booster doses, then they should follow the guidelines provided in Table 1.<sup>4</sup>
- If any of the pharmacy staff members are exposed to or infected with any occupational infections, they should follow the guidelines of vaccination provided in Tables 1 and 2.
- If the pharmacy staff gets an accidental needle stick from a hepatitis B infection, they should follow the guidelines in Table 3.<sup>4</sup>
- If any pharmacy personnel has an infection, they should follow the suggested work restrictions of pharmacy practice provided in Table 4.<sup>4</sup>

### CONCLUSION

The immunization of pharmacy personnel for vaccine-preventable occupational infections and related occupational protection through the implementation of approved policy and procedures are the fundamental preventive steps at all healthcare establishments. The policy and procedures should be extended to all immunization of new pharmacy employees, including the intern’s vaccinations, immunization for specific conditions, and immunization for any injuries of contaminated sharp materials. To protect themselves, all pharmacy workforce must be familiar with initial employment immunization and occupational infections. Optimal vaccination would enhance the quality of pharmacy workers’ overall performance and avoid any occupational infections.

### ACKNOWLEDGEMENT

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### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

### Funding

None

## Consent for Publications

It is not applicable in this review

## 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

**TB:** Tuberculosis; **HIV/AIDS:** Human Immunodeficiency Virus/ Acquired Immunodeficiency Diseases; **CDC:** Centers for Disease Control and Prevention of the United States of America; **SCDC:** Saudi Center for Diseases Control; **ASHP:** American Society of Health-System Pharmacists; **WHO:** World Health Organization; **UPS:** United States Pharmacopeia; **AGREE:** Appraisal of Guidelines, Research, and Evaluation; **IM:** Intramuscular; **SubQ:** Subcutaneous; **MMR:** Measles Mumps Rubella; **Tdap:** Pertussis Tetanus-Diphtheria Acellular Pertussis; **Td:** Tetanus, diphtheria; **PO:** Orally; **IPV:** Intravenous Polio Vaccine; **PPE:** Personal Protective Equipment; **IPC:** Infection Prevention and control; **SOPS:** Policies and standard operating procedures.

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## REFERENCES

- Frieden TR, Jaffe HW, Stephens JW, Thacker SB, Zaza S. General Recommendations on Immunization Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*. 2011;60(2):1-64.
- O'Leary ST, Maldonado YA, Kimberlin DW. Update from the Advisory Committee on Immunization Practices. *J Pediatr Infect Dis Soc*. 2019;9(1):3-5.
- Kim DK, Bridges CB, Harriman KH. Advisory Committee on Immunization Practices recommended: Immunization schedule for adults aged 19 years or older: United States, 2020. *MMWR. Morbidity and Mortality Weekly Report*. 2020;69(5):1-3.
- World Health Organization. Occupational infections [internet]. World Health Organization Publications [cited May 24 2022]. Available from: <https://www.who.int/tools/occupational-hazards-in-health-sector/occupational-infections>.
- Therapy M. ASHP guidelines on the pharmacist's role in immunization. *Am Soc Heal Pharm*. 2003;60:1371-7.
- Baroy J, Chung D, Frisch R, Apgar D, Slack MK. The impact of pharmacist immunization programs on adult immunization rates: A systematic review and meta-analysis. *J Am Pharm Assoc* (2003). 2016;56(4):418-26. doi: 10.1016/j.japh.2016.03.006, PMID 27450138.
- International Pharmaceutical Federation (FIP). An overview of current pharmacy impact on immunization – A global report [internet]. The Hague: International Pharmaceutical Federation; 2016. Available from: [https://fip.org/files/fip/publications/FIP\\_report\\_on\\_Immunisation.pdf](https://fip.org/files/fip/publications/FIP_report_on_Immunisation.pdf) [cited 26/5/2022].
- Al Knawy B, Khoja T, Balkhy H, Pittet D. *GCC Infection control manual*; 2013. p. 1-324.
- Diekema DJ, Doebbeling BN. Employee health and infection control. *Infect Control Hosp Epidemiol*. 1995;16(5):292-301. doi: 10.1086/647110, PMID 7657978.
- Bearman G, Munoz-Price S, Morgan DJ, Murthy RK, editors. Springer. *J Infect Prev*. 2018.
- Desforges JF, Gardner P, Schaffner W. Immunization of adults. *N Engl J Med*. 1993;328(17):1252-8. doi: 10.1056/NEJM199304293281708.
- Ontario Agency for Health Protection, Promotion, Provincial Infectious Diseases Advisory Committee. Best practices for infection prevention and control programs in all health care settings. *Public Health Ontario*; 2012. 87 p.
- US Department of Health and Human Services, Centers for Disease Control and Prevention. Infection control in healthcare personnel: infrastructure and routine practices for occupational infection prevention and control services recommendations only. p. 1-8; 2019. Available from: <https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-recommendations-only-H.pdf> [cited 26/5/2022].
- WHO. Infection Prevention and Control Assessment Framework at the Facility Level Introduction and user instructions [internet]. Vol. 2016; 2018. Available from: <http://www.who.int/infection-prevention/publications/core-com-> [cited 26/5/2022].
- Beattie M. A guide to infection control in the hospital. *Aust Infect Control*. 2001. 102 p;6(3). doi: 10.1071/HI01102.
- Ontario: Provincial Infectious Diseases Advisory Committee. Public health Ontario. Best practices for cleaning, disinfection, and sterilization of medical equipment/devices in all health care settings. 110 p.
- Ahmad IA, Rehan EA, Pani SC. Compliance of Saudi dental students with infection control guidelines. *Int Dent J*. 2013;63(4):196-201. doi: 10.1111/ijd.12030, PMID 23879255.
- Berhan Z, Malede A, Gizayatu A, Sisay T, Lingerew M, Kloos H, et al. Prevalence and associated factors of needle stick and sharps injuries among healthcare workers in northwestern Ethiopia. *PLOS ONE*. 2021;16(9) (September 9):e0252039. doi: 10.1371/journal.pone.0252039, PMID 34559802.
- Chatterjee A, Sarkar D, Sarkar K, Banerjee S, Ghosal A, Roy SK. needle stick injury (nsi) among rural healthcare workers in Amdanga Block in West Bengal Dr. World. *J Pharm Pharm Sci*. 2020;9(10):2139-45.
- Haiduvan DJ, DeMaio TM, Stevens DA. A five-year study of needlestick injuries: Significant reduction associated with communication, education, and convenient placement of sharps containers. *Infect Control Hosp Epidemiol*. 1992;13(5):265-71. doi: 10.1086/646525, PMID 1593109.
- De Perio M. Needlestick injuries among employees at a retail pharmacy chain–nationwide [internet]. Health hazard evaluation report; 2012. Available from: <http://198.246.124.29/niosh/hhe/reports/pdfs/2011-0063-3154.pdf> [cited 26/5/2022].
- De Perio MA. Needlestick injuries among employees at a nationwide retail pharmacy chain, 2000-2011. *Infect Control Hosp Epidemiol*. 2012;33(11):1156-8. doi: 10.1086/668033, PMID 23041816.
- Shanks NJ, Al-Kalai D. Occupation risk of needlestick injuries among health care personnel in Saudi Arabia. *J Hosp Infect*. 1995;29(3):221-6. doi: 10.1016/0195-6701(95)90332-1, PMID 7615940.
- El Beltagy K, El-Saed A, Sallah M, Balkhy HH. Impact of infection control educational activities on rates and frequencies of percutaneous injuries (PIs) at a tertiary care hospital in Saudi Arabia. *J Infect Public Health*. 2012;5(4):297-303. doi: 10.1016/j.jiph.2012.04.002, PMID 23021652.
- Kunishima H, Yoshida E, Caputo J, Mikamo H. Estimating the national cost burden of in-hospital needlestick injuries among healthcare workers in Japan. *PLOS ONE*. 2019;14(11):e0224142. doi: 10.1371/journal.pone.0224142, PMID 31697746.
- Cooke CE, Stephens JM. Clinical, economic, and humanistic burden of needlestick injuries in healthcare workers. *Med Devices (Auckl)*. 2017;10:225-35. doi: 10.2147/MDER.S140846, PMID 29033615.
- Paul T. Self-reported needlestick injuries in dental health care workers at Armed Forces Hospital Riyadh, Saudi Arabia. *Mil Med*. 2000;165(3):208-10. doi: 10.1093/milmed/165.3.208, PMID 10741084.
- McDiarmid MA, Presson AC, Fujikawa J. Controlling occupational exposure to hazardous drugs. *American Journal of Health-System Pharmacy*. 1996;53(14):1669-85. doi: 10.1093/ajhp/53.14.1669.
- Canada Government of Alberta. Handbook of occupational hazards and controls for pharmacy workers; 2011. p. 0-57.
- Power LA, POLOVICH M. Safe handling of hazardous drugs: Reviewing standards for worker protection. *Pharm Pract News*. 2011:1-12.
- National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. NIOSH Alert: Preventing occupational exposures to antineoplastic and other hazardous drugs in health care settings [internet]. Institute for Occupational; 2004. [google.com/scholar?hl=en&btnG=Search&q=intitle:NIOSH+ALERT:Preventing+Occupational+Exposures+to+Antineoplastic+and+other+Hazardous+Drugs+in+Health+Care+Settings#1](http://www.cdc.gov/niosh/docs/2004-165/pdfs/2004-165.pdf). Available from: <http://www.cdc.gov/niosh/docs/2004-165/pdfs/2004-165.pdf> [cited 26/5/2022].
- Alomi YA, Alyousef AM. Infection control pharmacist: A New Initiative Project in The Kingdom of Saudi Arabia. *PTB Reports*. 2021;7(2):40-3. doi: 10.5530/PTB.2021.78.
- Alomi YA, Abdullah Hakami LE, Yahya Khayat NA, Bamagaus YA, Rafuden Bakhsh TM, Adnan Khayat N, et al. Mass gathering (hajj) pharmacy infection control: New initiative in Saudi Arabia. *IJPCS*. 2020;9(1):5-9. doi: 10.5530/ijpcs.2020.9.2.
- Kastango ES, American Society of Health-System Pharmacists (ASHP). Blueprint for implementing USP chapter 797 for compounding sterile preparations. *Am J Health Syst Pharm*. 2005;62(12):1271-88. doi: 10.1093/ajhp/62.12.1271, PMID 15947127.
- United States Pharmacopeia, General Chapter USP <800> Hazardous Drugs-Handling in Healthcare Settings. The United States pharmacopeial convention. 2017. p. 1-20.
- USP, General Chapter USP <795> Pharmaceutical Compounding – Nonsterile Preparations. USP 42-NF [internet]. p. 1-13; 2019. Available from: <http://www.usp.org/compounding/general-chapter-795> [cited 26/5/2022]. In:.
- Rutala WA, Weber DJ, Weinstein RA, Pearson ML. Guideline for disinfection and

- sterilization in healthcare facilities. Centers for Disease Control and Prevention (CDC). p. 2019; 2008 [internet]. Available from: [http://www.cdc.gov/hicpac/Disinfection\\_Sterilization/10\\_0MiscAgents.html](http://www.cdc.gov/hicpac/Disinfection_Sterilization/10_0MiscAgents.html) [cited 26/5/2022].
38. Brouwers MC, Kerkvliet K, Spithoff K, AGREE Next Steps Consortium. The AGREE reporting checklist: A tool to improve reporting of clinical practice guidelines. *BMJ*. 2016;352:i1152. doi: 10.1136/bmj.i1152, PMID 26957104.
  39. Wattal C, Khardori N, editors. Hospital infection prevention. Springer; 2014.
  40. (PIDAC) PIDAC. Best practices for cleaning, disinfection, and sterilization of medical equipment/devices in all health care settings. 3<sup>rd</sup> ed. Public Health Ontario; 2013.
  41. Rutala WA, David MPH, Weber J, the Healthcare Infection Control Practices Advisory Committee. (HICPAC) PD. Guideline for disinfection and sterilization in healthcare: Facilities. CDC. 2008.
  42. Health BCM of. Best Practice Guidelines for Cleaning, Disinfection, and Sterilization of Critical and semi-critical Medical Devices. BC Minist Heal. 2007.
  43. WHO. Practical guidelines for infection control in health care facilities. *World Heal Organ*. 2004;41:110.