

COVID-19 Infection Prevention and Control Guidelines for Pharmacy Personnel in King Abdulaziz Medical City-Riyadh, Kingdom of Saudi Arabia

Haya Almufrij¹, Khalil Almajed^{1,2}, Fawziah Almutairi¹, Asma Altoub¹, Tahani Alsufian¹, Saad Alobaidi^{1,2}, Hamza Alsamanodi¹, Mohammed Alotaibi¹, Hind Albadali¹, Abdullah Al Romi¹, Fars Alrowili², Saleh Alanazi^{1,2,*}

¹Pharmaceutical Care Services, King Abdulaziz Medical City, Riyadh, Saudi Arabia

²King Saud bin Abdulaziz University for Health Science Collage of pharmacy and Abdullah International Medical Research Center, Riyadh, Saudi Arabia

Email address:

sa4270909@yahoo.com (S. Alanazi)

*Corresponding author

To cite this article:

Haya Almufrij, Khalil Almajed, Fawziah Almutairi, Asma Altoub, Tahani Alsufian, Saad Alobaidi, Hamza Alsamanodi, Mohammed Alotaibi, Hind Albadali, Abdullah Al Romi, Fars Alrowili, Saleh Alanazi. COVID-19 Infection Prevention and Control Guidelines for Pharmacy Personnel in King Abdulaziz Medical City-Riyadh, Kingdom of Saudi Arabia. *American Journal of BioScience*. Vol. 9, No. 4, 2021, pp. 134-140. doi: 10.11648/j.ajbio.20210904.14

Received: June 15, 2021; Accepted: July 12, 2021; Published: July 21, 2021

Abstract: *Background:* Since the outbreak of coronavirus disease 2019 (COVID-19) was announced in Wuhan City (China) on 31st December 2019, pharmacists worldwide have been playing a vital role in minimizing the adverse effects of the pandemic on healthcare systems. *Objective:* The guideline aims to provide clear, relevant, and comprehensive instructions for pharmacy staff on how to manage different medication processes during the COVID-19 pandemic. *Method:* This editorial discusses the development of a guideline named “CORONA VIRUS (COVID-19) Infection Prevention and Control Guidelines for Pharmacy Personnel in the Hospital Setting” by Pharmaceutical Care Services in King Abdulaziz Medical City, Riyadh, Kingdom of Saudi Arabia. *Result:* Pharmaceutical Care Services established the guideline in March 2020, which was then updated in June 2020 by Pharmaceutical Care Services in King Abdulaziz Medical City, Riyadh, Kingdom of Saudi Arabia to respond rapidly to the urgent need for a comprehensive approach to manage medication processes during the COVID-19 pandemic and monitor the implementation overall the hospital. *Conclusion:* This guideline is a reliable and comprehensive source of information and can be implemented by any pharmacy department within the Kingdom of Saudi Arabia and internationally. To the best of our knowledge, this work might be the first in the field of management of medication processes.

Keywords: King Abdulaziz Medical City, Hospital Pharmacy Services, Frontline Pharmacists, Infection Prevention and Control Guidelines, COVID-19, Pandemic

1. Introduction

The World Health Organization (WHO) was initially informed of the first cluster of cases of coronavirus disease 2019 (COVID-19) in Wuhan City (China) on 31st December 2019 [1]. Since then, more than 4.22 million cases of COVID-19 have been reported globally, and on 13th May 2020, there were more than 1.17 million fatalities worldwide [2]. The Director-General of the WHO declared the COVID-19

situation as a pandemic on 11th March 2020 [3]. Since this announcement, many countries have used a combination of containment and mitigation to delay major surges in infections and protect the most vulnerable individuals from infection [4]. Preventive measures must be taken to reduce the spread of the COVID-19 and tackle the pandemic effectively [5].

The motive for this paper is to address the scarcity of resources for managing therapy processes during the COVID-19 pandemic and establish general instructions inspired from preventive measures published to date (i.e.,

hand hygiene and use of proper personal protective equipment). Furthermore, the primary aim is to share knowledge with the rest of the world. The Institute for Safe Medication Practices has reported instructions for the proper use of automated dispensing cabinets (ADCs) during the COVID-19 pandemic. The instructions include proper methods for accessing ADCs, decreasing traffic, limiting cross-contamination, securing the storage of critical items, returning unused medications, maintaining safe practices, and redeploying ADCs [6].

The work routine of pharmacists in Pharmaceutical Care Services involves checking, compounding, and dispensing medications, communicating with physicians, providing patients with information and advice, explaining the proper use of medications, and supervising pharmacy staff, including technicians and pharmacy aides. However, pharmacists have been performing additional duties during this pandemic, such as engaging in virtual clinic prescription processes, responding to an increased number of telephonic medication refill requests, and ensuring home delivery of medications for patients during curfews. Elbeddini *et al.* (2020) noted that hospital pharmacists have been part of COVID-19 efforts, and their roles include management of drug shortage, development of treatment protocols, participation in patient rounds, interpretation of the laboratory results of patients with COVID-19, participant recruitment for clinical trials, exploration of new drugs, medication management advice, and antimicrobial stewardship [7].

During this pandemic, the objective of the joint effort of healthcare services extends from the prevention of new infections to reduction in the number of cases at any given time or “flattening the curve.” This reduction can be achieved by minimizing contact between individuals. Pharmaceutical Care Services responded to this issue by making necessary changes to provide a high standard of service while maintaining safety precautions. The changes included minimization of direct contact with patients, visitors, medical and paramedical staff, and other employees working in different services and promotion of social distancing measures while encouraging remote working from home wherever possible.

To protect the patients, staff, and students at King Abdulaziz Medical City (KAMC), several measures have been implemented based on the status of the pharmaceutical operational plan, such as reduction of services and establishing infection control guidelines. In this paper, we focus on infection control guidelines.

In light of the above-mentioned approaches, the need for a comprehensive guideline to cover all medication processes in the pharmacy was investigated. As a result, a guideline named “CORONA VIRUS (COVID-19) Infection Prevention and Control Guidelines for Pharmacy Personnel in the Hospital Setting” was developed (see Appendix for full details of the guidelines) [8]. The aim of this paper to provide clear, relevant, straightforward, and comprehensive instructions to pharmacy staff on how to act/function in different medication processes during the COVID-19 pandemic.

2. Setting

Pharmaceutical Care Services in KAMC, the Ministry of National Guard Health Affairs, Central Region, Riyadh, Kingdom of Saudi Arabia.

3. Method

This guideline by Pharmaceutical Care Services was established in March 2020 to respond rapidly to the urgent need for a comprehensive approach to manage medication processes during the COVID-19 pandemic and was updated in June 2020. It was developed with assistance from the Infection Prevention and Control Program and distributed to pharmacy staff for mandatory implementation. Any violation was recorded as a safety report via the Safety Reporting System in the institution.

4. Infection Control Guidelines for Pharmacy Personnel in the Hospital Setting

Pharmacists are essential in the global fight against the COVID-19 pandemic. They are the most experienced and knowledgeable personnel with respect to medications, preparation of medications for patients, and provision of pharmaceutical care, especially for COVID-19 patients. There were no guidelines from infection control centers specifically directed at pharmacy personnel. Some general precautionary and instructive emails were circulated weekly through the hospital administrative services. However, these emails were limited in scope and general to all hospitals. Internationally, guidelines pertaining to pharmacy practice were only developed for community pharmacies and not for pharmacy services within tertiary hospitals that housed inpatient and outpatient pharmacy services. Therefore, Pharmaceutical Care Services produced a clear and concise infection control guideline for pharmacy personnel, adapted from the WHO guidelines (WHO, 2020 and CDC, 2020). The guidelines make the following general recommendations.

1. Ensure social distancing and avoid shaking hands.
2. Clean and disinfect hands regularly per the detailed process outlined [9].
3. Minimize unnecessary walking in and out of the pharmacy areas.
4. Use tissues while coughing and sneezing, dispose them correctly, and disinfect hands.
5. Use a mask.
6. Avoid wearing bracelets, watches, and rings.
7. Provide a list of surfaces on which the virus can survive and for how long.

The infection control document also provides guidance on specific tasks, such as medication delivery to wards with suspected/confirmed COVID-19 cases (e.g., regular rounds

by pharmacy aides¹, use of pneumatic tubes², and filling of ADCs by technicians), role of pharmacists during code blues in suspected or confirmed COVID-19 cases, measures to ensure the safety of pharmacists and other healthcare professionals attending to code blues, handling of crash carts and medication tray preparation and refilling, return and disposal of medications, discharge procedure, and handling of narcotic and controlled drugs [10-13] (see Appendix). This guideline will be a relevant and useful resource to be used in case of a future pandemic. It is notable though that communicating the details of this guideline to the staff in a brief period was challenging. However, this issue was overcome by ensuring frequent reminders and constant supervision of pharmacy practice in the institution. Hospital pharmacists can help with the enrolment of infected patients for these types of studies [14]. Pharmacists played an important role in timely refilling of medications which reduced unnecessary hospital visits where individuals were at high risk of being exposed to Covid-19 [15].

5. Conclusion

There could not be a more important priority than protecting frontline pharmacy staff, especially those in the front lines (i.e., pharmacists, pharmacy technicians, and pharmacy aides) during the Covid-19 pandemic. Regardless of whether it is a natural or health crisis, initiatives need to be taken to provide relevant information and develop reliable guidelines that can guide and protect pharmacists and other healthcare professionals. These initiatives will enable them to interact safely and effectively to manage medication processes during a critical situation such as this pandemic. According to these criteria, we consider the guideline developed by Pharmaceutical Care Services to be a very reliable and comprehensive source of information. To the best of our knowledge, this work might be the first in the field of management of medication processes.

Author Contributions

Haya Almufrij, Hind Albadali, and Fawziah Almutairi contributed to data collection and manuscript writing; Asma Altoub and Tahani Alsufian contributed to updating the guideline and writing; Khalil Almajed, Saad Alobaidi, Abdullah AlRomi, Hamza Alsamanodi, and Mohammed Alotaibi contributed to reviewing the guideline; Fars Alrowili and Saleh Alanazi, prepared the manuscript draft.

Competing Interest

The authors declare that they have no competing interests.

1 Pharmacy aide: A pharmacy aide is an assistant to a pharmacist and performs various tasks alongside technicians.

2 Pneumatic tube system: It is a network of pipes and stations. The system comprises pipes, which are paths, and stations, which are nodes (Departmental Policies and Procedures, 7330-16-02-00 version 2016).

Acknowledgements

We would like to acknowledge the support from Pharmaceutical Care Services in facilitating and approving data collection from various sources and King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences. We are grateful to the Infection Prevention and Control Program at the National Guard for Health Affairs for constant input regarding the development of the guideline. We would also like to acknowledge the contribution of Mr. Fars Alroweli for his input and contribution to the final manuscript.

Appendix

CORONAVIRUS (COVID-19) Infection Control Guideline for Pharmacy Personnel in the Hospital Setting (Third Version-Reviewed 21 July 2020)

I. Purpose of This Document

The aim of this document is to provide relevant information and a guideline on Coronavirus Disease 2019 (COVID-19) Outbreaks for the pharmacy personnel in hospital settings.



Figure 1. Instruction during sneeze or cough.

II. General Recommendations for Pharmaceutical Care Staff

- Disinfect your hands when entering the pharmacy.
- Hand hygiene is essential for preventing the spread of the

virus, and it should be performed by applying the correct technique recommended by the WHO using either soap and running water or an alcohol-based hand sanitizer. (https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf?ua=1)

b. Make sure you keep a distance of 1–2 meters between you and others.

c. Minimize unnecessary walking inside to outside the pharmacy areas.

d. If you sneeze or cough, cover your nose and mouth with a disposable tissue or with a flexed elbow and then practice proper hand hygiene. (Figure 1)

e. Avoid shaking hands and close contact while in the pharmacy.

f. Adhere to the cleaning and disinfecting manual

The pharmacy staff shall clean and disinfect the working environment, relevant objects, and equipment in accordance with the relevant cleaning and disinfection guidelines and regulations.

<http://manuals.ngha.med/openFile.aspx?FName=Manual%20for%20Cleaning%20and%20%20Disinfecting%20Non-Critical%20Care%20%20Items%202018.pdf&Folder=\\riysv nfs-100\ManualsDoc\16\2845\Documents\>

g. Wear a surgical mask at all times inside and outside clinical areas:

1. Proper hand hygiene should be performed before and after donning and doffing.
2. Masks are effective only when used in combination with frequent hand cleaning and
3. Alcohol-based hand rub or soap and water.
4. If you wear a mask, then you must know how to use it and dispose of it properly. All
5. Pharmacy personnel must follow the proper doffing procedure when using masks and
6. Other personal protective equipment. (Figure 2)

h. Avoid wearing accessories such as bracelets, watches and rings.



Figure 2. Personal protective equipment.

naVirus/guidline/Interim%20Practical%20Guidance%20COVID-19-(21.07.20).pdf

VI. Management of Pharmacy Services

1. Medication Delivery to the Wards with Suspected/Confirmed Cases

1.1. Regular rounds by pharmacy aids

- Avoid entrance of trollies to the isolation wards.
- Use plastic bags for carrying medications
- If you reach the unit door, call the nurse manager to collect medications
- For the narcotic /control IV piggyback and syringes; pharmacy aid fills the delivery sign-out sheet by requesting the nurse badge number and provide his badge number to the nurse to fill her own narcotic logbook.
- Do not receive any returned medications from the mentioned units before the due time (3 days as per label)
- The transportation equipment (trollies) and containers should be disinfected according to the requirements of the environment (refer to cleaning and disinfection guidelines and regulations).
- Avoid wearing gloves during the round and adhere to hand wash and disinfecting protocol.

1.2. Pneumatic tubes

Do not use the system to and from the isolation wards.

Automated dispensing cabinet (ADC) filling by technicians

- Minimize the restocking frequency (suggested to increase the stock)
- Pharmacy aid will deliver medication bags to the corresponding pharmacy satellite in the isolation wards.
- Adhere to hand wash and disinfecting protocol pre- and post-filling.
- Use plastic bags for carrying medications and avoid entering trollies and medication bins inside the unit.
- Encourage the nurses and pharmacists to utilize the blue slip for any ADC nil stock.

2. Code Blue

2.1. If a pharmacist attends a code blue for suspected or confirmed case:

- Stay with the black box outside the patient room 1-2 meters, to be able to take the instruction from the code blue team leader.
- Wear a surgical mask.
- In case you need to go inside the patient's room, you should wear proper PPE prior to entering the patient's room.
- The use of N95 or higher-level respirators (for those who pass the N95 fit test only) is recommended only if required by isolation precaution for this specific patient.

2.2. Follow standard precautions if there is no alert sign of the appropriate isolation (contact, droplet, airborne).

2.3. Adhere to hand wash and disinfecting protocol pre and post the code response.

2.4. Black box should be disinfected prior to getting out from the unit.

2.5. After refilling the black box, can be send by pharmacist or pharmacy technician in special round.

3. Crash Cart Medication Tray

- It is appropriate to use the disposable tray.
- After usage (code blue), the nurse will discard the disposable tray and fill the included coupon for a new tray request.
- Any unused Crash Cart medication that needs to be returned must be placed in a plastic bag, labeled with the date, and stored in a secured and sequestered location. Then, after a minimum of 3 days (the elapsed time beyond which viability of any potential virus on services should be eliminated), the pharmacist may remove the medication from the bag and evaluate whether they can be restocked or should be discarded.
- ALL crash cart medication trays should be added to isolated units as ADC items with suitable quantities (following the institution guidelines) as override medication (if possible) to be used as back up till the crash cart tray is replaced.
- As precaution, pharmacy aide and pharmacist who are working in preparing and checking the replaced crash cart, should practice hand hygiene before and after manipulating the cart.

4. Handling Returned Medications

- Re –encourage the nursing department to send patient's home medications back home with his/her relative upon admission. Also, avoid sending them to the pharmacy (except non-formulary items that need to be utilized during patient admission).
- Any unused medications that need to be returned to the pharmacy must be placed in a plastic bag, labeled with the date, and stored in a secured and sequestered location. Then, after a minimum of 3 days, a pharmacist may remove the medication from the bag and evaluate whether they can be restocked or should be discarded. No multiple dose vials are returned to the pharmacy, as they are used for one patient and then discarded.

5. Discharge Medication

- For discharge medication not collected (MNC), follow the hospital policy.
- (3 days in the unit and then return it to pharmacy).
- As precaution, pharmacy personnel who is working in segregating and documenting the returned medication should practice proper hand hygiene before and after the activity.

6. Narcotic and Control Medication (N/C)

- Adhere to hand hygiene and disinfecting protocol pre- and post-filling.
- Medication delivery should be in a bag to the isolation wards.
- Minimize rounds as much as possible to only once per week.

- d. Make a separate round for the isolation unit.
- e. Collect the empty vials every 3 weeks in a separate zip lock.
- f. All medications should be dispensed from the ADC.
- g. Any wastage should be documented in the BESTCare (HIS- CPOE) through an E-wastage report.
- h. Completed N/C sheets for infusions or Lorazepam injections from the isolation units to be collected once per week.

V. Recommendations

Measures that should be considered by the pharmacy management:

- a. Carry out full staff training.
- b. Ensure adequate cleaning and disinfection management.
- c. Strengthen medical waste management.
- d. Before dispensing any expensive or restricted medications in isolated wards, pharmacists need to confirm before dispensing to avoid wastage.
- e. prevent traffic at the pharmacy door.

References

- [1] World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). February, 2020. <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf> (accessed March 13, 2020). Retrieved from <https://www.who.int/docs/default-source/coronaviruse/who-chinajoint-mission-on-covid-19-final-report.pdf> (on 16.05.2020).
- [2] COVID-19: epidemiology, virology, and clinical features (Guidance) organisation: Public Health England. <https://www.gov.uk/government/publications/wuhan-novel-coronavirusbackground-information/wuhan-novel-coronavirus-epidemiology-virology-and-clinicalfeatures#epidemiology> (Accessed 14/05/2020).
- [3] World Health Organization. WHO Virtual press conference on COVID-19. March 11, 2020. https://www.who.int/docs/default-source/coronaviruse/transcripts/who-audioemergencies-coronavirus-press-conference-full-andfinal11mar2020.pdf?sfvrsn=cb432bb3_2 (Accessed March 16, 2020).
- [4] Bedford, J. Enria, D. Giesecke, J. Heymann, D. L. Ihekweazu, C. Kobinger, G. (2020). COVID-19: towards controlling of a pandemic. *The Lancet*. 395 (10229): 1015-1018 DOI 10.1016/S0140-6736(20)30673-5.
- [5] World Health Organization. (2020). Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19) and considerations during severe shortages. WHO. April: 1-28 <https://apps.who.int/iris/handle/10665/331695> (Accessed July 2020).
- [6] ISMP. (2020). SPECIAL Considerations for ADC usage during COVID-19. Medication Safety Alert Acute Care. 25 (7). <https://ismp.org/sites/default/files/newsletterissues/20200416.pdf>
- [7] Elbeddini, A. Prabakaran, T. Almasalkhi, S. Tran, C. (2020). Pharmacists and COVID-19. *Journal of Pharmaceutical Policy and Practice*. 3: 1-4.
- [8] Quality Improvement Section in Pharmaceutical care services. (2020). CORONAVIRUS (COVID-19) Infection Control Guidelines for Pharmacy Personnel in the Hospital Setting 3rd version. Internal Guidelines – Ministry of National Guard Health Affairs – Central Region. Unpublished.
- [9] World Health Organization WHO. Hand Hygiene: Why, How & When?. 2009, August. https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf?ua=1
- [10] Chinese Pharmaceutical Association. (2020). CORONAVIRUS 2019-nCoV INFECTION: Expert Consensus on Guidance and Prevention Strategies for Hospital Pharmacists and the Pharmacy Workforce (1stEdition). February: 06. <https://www.fip.org/files/content/priorityareas/coronavirus/CPA-CORONAVIRUS-2019-nCoV-Expert-Consensus-on-Guidance-and-Prevention.pdf>
- [11] International Pharmaceutical Federation (Health Advisory). (2020) COVID-19 pandemic: Guidelines for pharmacists and the pharmacy workforce. March: 26. <https://www.fip.org/files/content/priority-areas/coronavirus/COVID-19-Guidelines-forpharmacists-and-the-pharmacy-workforce.pdf>
- [12] “What is a Pharmacy Aide?” Learn.org. https://learn.org/articles/What_is_a_Pharmacy_Aid_e.html (Accessed 12. August. 2020).
- [13] Pharmaceutical Care Services. (2016) Departmental Policy and Procedure: 7330_16_02_00_Pneumatic_Tube_System. Internal DPP - Ministry of National Guard Health Affairs – Central Region. Unpublished.
- [14] Al-Quteimat OM, Amer AM. SARS-CoV-2 outbreak: how can pharmacists help? *Res Soc Adm Pharm*. 2020; S1551-7411 (20): 30238–2.
- [15] Bukhari N, Rasheed H, Nayyer B, Babar ZUD. Pharmacists at the frontline beating the COVID-19 pandemic. *J of Pharm Policy and Pract*. 2020; 13: 8.

Biography

Haya Almufrij: RPh. Haya almufrij Al Mufrij. Professional master's in health quality. Health Quality Management Diploma. Bachelor in Pharmaceutical Science, King Saud University. Senior Pharmacist, Pharmaceutical Care Services, King Abdulaziz Medical City, Ministry of National Guard Health Affairs-Riyadh

Khalil Almajed: Executive Director of Operations, Lecturer at College of Pharmacy, King Saud bin Abdulaziz University for Health Sciences, Ministry of National Guard Health Affairs, Bachelor of Pharmacy, Master of Health and Hospital Administration, and Master of Medical Education.

Fawziah Almutairi: RPh. Fawziah Almutairi, master's in pharmacology, King Saud University Bachelor in Pharmaceutical Science, King Saud University. Senior Pharmacist, Pharmaceutical Care Services, King Abdulaziz Medical City, Ministry of National Guard Health Affairs-Riyadh

Asma Altoub: RPh. Asma Altoub: Master in Health Systems and Quality Management, King Saud bin Abdulaziz University for Health Science Bachelor in Pharmaceutical Science, King Saud University Senior Pharmacist, Pharmaceutical Care Services, King Abdulaziz Medical City, Ministry of National Guard Health Affairs-Riyadh

Tahani Alsufian: Tahani Nasser Al-Sufian, Pharm. D, M.Sc in Quality Control Pharmaceuticals Products (QCPP). Supervisor of Compounding, Medication and Material Supply Pharmaceutical Care Service King Abdulaziz Medical City – Riyadh Ministry of National Guards Health Affairs, Saudi Arabia

Saad Alobaidi: Dr. Saad S. Al Obaidy holding PhD. in Clinical Pharmacy. Director of Pharmaceutical Care Services, King Abdulaziz Medical City Assistant Professor, College of Pharmacy, Pharmacy Practice

Hamza Alsamanodi: Hamza Al Samanhodi is The Assistant director of Pharmacy, inpatient services in King Abdulaziz Medical city ministry of national guard health affairs in Riyadh, he hold a master degree in clinical pharmacy from King Saudi University in 2012, he has 15 years experience in Compounded Sterile preparations and United State Pharmacopia 797-800, Dr. Al Samanhodi had many researches and presentations related to pharmacy practice and medication safety local and international, as well as he is a joint lecturer in collage of pharmacy at King Saud Bin Abdulaziz university for health sciences in Riyadh

Mohammed Alotaibi: Mohammed Khamees Al Otaibi, B.Sc. Pharm Master degree in public Administration Assistant Director, Pharmaceutical Care Department at King Abdullah Bin Abdulaziz Specialized Children Hospital Riyadh Ministry of National Guard Health Affairs

Hind Albadali: Dr. Hind Ahmed Albadali PhD in patient safety and quality - Imperial College London. MSc in Health Management Planning and Policy - Leeds University. Bachelor of science in pharmacy - King Saud University. Currently Assistant Professor in Imam Abdulrahman Bin Faisal University. Associate Senior Pharmacist in the Royal Pharmaceutical Society-United Kingdom.

Abdullah AlRomi: supervisor of Pharmaceutical Care Services cardiac center, King Abdulaziz Medical City, Ministry of National Guard Health Affairs-Riyadh B.Sc. Pharm King Saud University Fars Alrowili: student graduated from College of Pharmacy, King Saud bin Abdulaziz University for Health Science

Saleh Alanazi: Manager Quality pharmaceutical care services in King Abdulaziz medical city in Riyadh. Faculty member at the College of Pharmacy, King Saud bin Abdulaziz University for Health Science. Adjunct assistant professor at Almaarefa University. Surveyor in Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) in pharmacy. Hold Ph.D. degree in pharmaceutical science from King Saud University 2020.