Redefining Medical Practice Office Infection Prevention and Control during the COVID-19 Outbreak

**Issa Kawalit[1]*,
Muhand Eltwal[2],
Wiam Hussein[3],
Eyadeh Mdanat[4] and
Laith Al-Rabadi[5]**

1   Arab Renal Care Group, Amman, Jordan
2   New England Sini Hospital, MA, USA
3   Endocrinology Department, Royal Bahrain Hospital, Bahrain
4   Endocrinology Department, Farah Medical Campus, Amman, Jordan
5   Renal Division, University of Utah Hospital, UT, USA

*Corresponding author: Issa Kawalit

✉   ikawalit@yahoo.com;
    lbakaeen2000@yahoo.com

Tel: 962777741008

Chief Medical Officer, Arab Renal Care Group, Amman, Jordan.

Abstract

Novel Coronavirus disease (COVID-19) is a recently discovered infectious disease caused by severe acute respiratory syndrome (SARS)-coronavirus (CoV)-2 viruses. The disease was identified in 2019 in Wuhan, China, and has since spread globally, resulting in the 2020 coronavirus pandemic. The infection spreads via droplets produced during coughing and sneezing. While social distancing will help minimize the spread of COVID-19 infection, this practice is difficult for patients seeking medical treatment. Unfortunately, there is no easy alternative. While many people may be able to postpone daily routine appointments to avoid contacting infection, sick patient with urgent medical appointments cannot. Strategies to prepare the medical practice offices for this pandemic to optimize patient care and to lower the risk of viral transmission to healthcare workers and other patients in the clinical office should be prioritized. Herein, we present the perspective of a group of physicians who felt the need for urgent response measures to develop infection control guidance for the medical practice office.

Keywords: Coronavirus; COVID-19; Respiratory infection

Introduction

Novel Coronavirus disease (COVID-19) is a recently reported infectious disease caused by severe acute respiratory syndrome (SARS)-coronavirus (CoV)-2 viruses. It primarily manifests as an acute respiratory illness with interstitial and alveolar pneumonia, but it can affect multiple organs such as the heart, kidney, digestive tract, and nervous system [1]. The disease was first identified in 2019 in Wuhan, China, and has since spread globally, resulting in the 2019-20 coronavirus pandemic [2]. As of September 25th, 2020, 32,029,704 cases of COVID-19 have been reported worldwide in more than 200 countries, with 979,212 deaths [3]. The infection typically spreads from one person to another via respiratory droplets produced during coughing and sneezing [4,5]. Time from exposure to onset of symptoms is generally between 2 and 14 days, with an average of 5 days [6,7]. The standard method of testing is reverse transcription-polymerase chain reaction (rRT-PCR) from a nasopharyngeal swab. Transmission within healthcare centres to healthcare workers has been documented [8,9]. Almost 3000 healthcare staff has been infected in China, and at least 22 died. Transmission to family members was reported. Although transmission occurs mostly via symptomatic individuals, there are reports of asymptomatic individuals who transmitted the disease to multiple family members [10]. These reports demonstrate the need for prevention of cross-infection. Evidence related to transmissibility and mortality should increase awareness among the clinical community of the importance of vigilance, preparation, active management, and protection.

The widespread use of protective equipment (such as masks, gloves, gowns, and eyewear) in the care of patients with respiratory symptoms must be prioritized. However asymptomatic and undiagnosed patients in emergency departments, outpatient offices, homes, and other settings, represent a real challenge. Therefore, ensuring routine droplet barrier precautions, environmental hygiene, and overall sound infection prevention practice is warranted.

Protection is achievable even without N95 masks. In a study of outpatient health care staff in diverse ambulatory practices, face masks applied to both caregiver and patients provided effectively similar protection as N95 face masks in the incidence of laboratory-confirmed influenza among caregivers who were routinely exposed to patients with respiratory viruses [11]. Adherence to guidelines for masks, hand hygiene, and environmental hygiene enhanced the safety of health care workers.

Strategies should be implemented to prepare the medical practice for this pandemic to optimize patient care. These include space management, staff education, and supplies maintenance. Also, infection prevention measures need to be implemented to prevent the spread of infection. As a group of physicians, we developed infection outbreak response measures in the outpatient settings. The two goals were to facilitate the care of patients with known or suspected COVID-19 who needed medical attention and to reduce the risk of viral transmission to healthcare workers and other patients in the clinical office. This review article aims to describe the measures that need to be taken to address these goals, including identification of suspected cases, modification of workflow and processes, management of staff, and even using telehealth [12-14].

General Information and Literature Review

- Medical staff carrying the virus (ascertained) must avoid work until cleared by the infection specialist team.

- The working team consisting of physicians and nursing staff should receive training in updated clinical practice and management of COVID-19, performing nasopharyngeal swabs for PCR COVID-19 with adequate protection, assessing infection risk, utilizing epidemic prevention tools, and acquiring guidelines from the government, academic societies and delivering them to all medical care personnel as needed, preferably online.

- Information on travel, occupation, contacts, and cluster history of each medical staff, patient, family members, residents of the same household, and colleagues at work should be reported and updated regularly.

- Members of the medical-nursing staff must self-monitor their health and immediately inform the director if either they or their family members have developed symptoms suggestive of COVID- 19 infection.

- Proactively contact at-risk patients and risk-stratify patients according to their risk for morbidity and mortality if they contract the infection. Arrange for pharmacy delivery if they require medications.

- Keep high-risk patients out of the emergency department or hospital if they do not have a medical emergency.

- Limit the number of medical appointments to the minimum and separate each appointment by 30 minutes.

- Activate a simple triage procedure before the patients enter the clinical practice office by contacting patients with appointments and identify suspected patients with COVID-19 by taking the history of contact with COVID-19 infected patients and travel history.

- Reduce the time in the waiting areas and regulate the flow in the dedicated rooms.

- Staff and patients must measure body temperature before entering the medical practice office.

- All patients must wear a surgical mask once they enter the medical practice office, in the waiting room, and during the examination.

- Keep space in waiting areas for patients to sit separated from other patients by at least 6 feet. Medically stable patients can wait in a vehicle or outside the medical practice office where they can be reached by phone when it is their turn to be seen.

- We recommend limiting the number of caregivers to the minimum and, if possible, prohibit their presence in the medical practice office.

- If a patient was seen and examined in the medical practice office and later tested positive for COVID-19, the areas used must be made available to other patients only after adequate sanitization. Moreover, we would recommend informing the medical authority to trace their contacts and implement quarantine measures according to the adopted policies. Also, all staff should be tested for COVID-19 and return to work after being cleared by infectious disease specialists.

- It is recommended that the office staff have meals at different times to avoid eating together. Goggles, hats, and face masks should be removed before meals, and hands washed with flowing water and soap. Talking during meals should be avoided to reduce the spread of droplets.

- Patients can bring small snacks such as candy to prevent hypoglycaemia.

- Family members living with patients must follow all the precautions and regulations given to patients to prevent person-to-person transmission of COVID-19, which includes good personal hygiene and prompt reporting of potentially sick family members.

- Once the family members or caregiver of a patient has become infected with COVID-19, the patient's identity should be upgraded and treated as a patient with suspected COVID-19 infection, as noted above.

- Medical personnel having direct care with the patient should keep a distance of at least 2 meters with minimizing physical contact to avoid transmitting the virus. Both patient and health care provider should avoid talking during physical exam.

Patient-specific disinfection recommendations

- The patient should be sanitized before entering the

medical practice office by encouraging them to use hand hygiene with alcohol solution and to scrub the sole of their shoes against a mat filled with chlorine dioxide/or use disposable shoe cap. Once the patient is inside the office, they should be encouraged to wash hands and face with soap and water.

- The patient should wear disposable surgical masks and gloves. It is essential to wear and remove Personal Protective Equipment (PPE) in the correct order to reduce cross-contamination. Removed PPE should be placed in the assigned medical waste bags as infectious waste.

- The patient should be encouraged to use hand hygiene with alcohol solution when exciting the office.

Staff specific disinfection recommendations

- Staff should perform hand and face hygiene.

- The office staff should wear disposable medical caps, surgical masks, goggles, gloves, and disposable protective suits. It is vital to wear or remove PPE in the correct order, which can help reduce cross-contamination. Reusable goggles should be disinfected.

- Staff should carefully change their PPE each time they are in contact with a patient.

- Removed PPE should be placed in the assigned medical waste bags as infectious waste.

Medical practice office specific disinfection recommendations

- Ventilation systems for medical practice office settings should be designed and modified by engineers in collaboration with infection-control and occupational health specialists. Incremental improvements in environmental controls are likely to lessen the potential for COVID-19 transmission from persons with unsuspected or undiagnosed COVID-19 infection.

- The medical practice office should enhance the management of air-conditioning systems and natural ventilation according to the office structure, layout, and local climate conditions. The air circulation should be strengthened by taking practical measures, like opening the door and windows when the temperature is appropriate and when the air-conditioning system is used.

- Disinfect and clean the exhaust fan once a month or as recommended by the occupational health Disinfect.

- The medical practice office should take measures to classify waste, collect used masks, and remove them in time. Garbage containers should be disinfected with chlorine-containing disinfectants by spraying or wiping regularly.

- The medical practice office should frequently disinfect the contacted object surfaces in general population areas (check-in counters, verification credential counters, elevator buttons, handrails), by spraying and wiping with 250~500 mg/L chlorine-containing disinfectant or 250 mg/L chlorine dioxide or as recommended by the occupational health authority.

- The medical practice office should continue to follow the infection control requirements related to cleaning and disinfection using products with Environmental Protection Agency-approved emerging viral pathogens claims recommended for use against COVID-19.

- The medical practice office disinfection should be performed twice daily, before starting the medical office hours and at the end of the medical office hours. Disinfect the air and environment integrated by using the vaporization (gasification) hydrogen peroxide disinfection device or with chlorine dioxide.

- The doors and windows should be closed before disinfection and opened for ventilation after 60 minutes. After disinfection, they should wipe the surface of all objects with a disposable cloth.

- The medical practice office should be sprayed or cleaned with chlorine-containing disinfectant for 60 minutes.

- The medical practice office should clean the medical equipment with disinfectants according to the manufacturer's instructions and as recommended by the occupational health authority.

- The staff should ensure that equipment is in good working condition and placed in the correct storage areas [12-16].

Suspected or confirmed COVID-19 infection

- Clinically stable patients with suspected or confirmed COVID-19 infection should be managed medically from his residence. Unstable patients should be admitted to an assigned hospital for treating COVID 19 positive patients [12-14].

- If a newly suspected or confirmed case of novel coronavirus infection in the medical practice office was identified, disinfection should be performed immediately. Areas in close contact with infected patients should not be used for other patients until cleared by the infection control authority.

- The medical waste from suspected or confirmed patients with novel coronavirus infection should be considered as infectious medical waste and disposed of accordingly [17].

Points to remember

- The PPE should be worn in the right sequence of the disposable medical cap, surgical mask, protective suits, goggles, and medical rubber gloves. After staff duty, the protective equipment should be removed in the sequence of gloves, hand disinfection, goggles, protective suits, hand disinfection, masks, and caps [12-14].

- Disinfect hand before wearing protective equipment.

Figure 1 Algorithm for suggested approach to asymptomatic patient during COVID-19 pandemic [17-23].

- Replace face masks as recommended by the manufacturer and by the infection-control specialists.

- Thoroughly cover hair and hairline shreds by wearing a cap.

- Replace personal protective equipment immediately when it contacts the passenger's blood, vomit, and other pollutants with infection risk.

- Disinfect and dry reusable goggles after each use.

- Carefully take off protective equipment without touching the face with both hands.

- Discard the removed disposable protective equipment into the medical waste bag.

- The shoe soles should be disinfected by footpads containing disinfectant.

- Highly consider the use of telehealth.

Telehealth into a new light

Telehealth failed to deliver what was promised in the past years. Healthcare system was anticipated to be more accessible without the need to wait in line. However, the reality is that only few countries adopted this strategy, and telehealth remains merely

Figure 2 Algorithm for suggested approach to symptomatic patient during COVID-19 pandemic [17-23].

a concept for many others. The emergence of the COVID-19 pandemic global crisis forced healthcare institutions and healthcare providers to turn to alternative ways of providing healthcare to limit the spread of the virus. Currently, telehealth is widely accepted as the ideal solution to patients and health care providers. Both the WHO and CDC are advocating for telehealth to monitor patients and reduce the risks of them spreading the virus by traveling to hospitals.

Suggested approach to patient during COVID-19 Pandemic

Many patients may present with fever and flu-like symptoms, it would be unreasonable and impractical to test those patients for COVID-19. A suggested approach to asymptomatic **(Figure 1)** and symptomatic **(Figure 2)** patient suspected of COVID-19 infection is included below [17-23] **(Table 1).**

Table 1 Detail information of asymptomatic and symptomatic patient suspected of COVID-19 infection.

*<u>**Self-monitoring**</u>:
- Defined as the action people take to monitor themselves for respiratory symptoms and any high temperature twice a day. If they developed fever or respiratory symptoms during the self-monitoring period, they should self-isolate, and seek advice by telephone from the local health department to determine whether laboratory tests and medical evaluation is needed.

*<u>**Active monitoring:**</u>
- Defined as the action the public health authority takes to monitors potentially exposed people to assess for the presence of respiratory symptoms and fever.

*<u>**Symptomatic:**</u>
- Patient presenting with fever of any grade or respiratory symptoms including cough and difficulty breathing.

*<u>**Asymptomatic**</u>
- Patient presenting with symptoms other than respiratory symptoms or fever that does not correlate with COVID-19 infection.
- Patient presenting for medical follow up without any symptoms.

*<u>**Quarantine**</u>:
- Defined as the separation of a person believed to have been exposed to a communicable disease, from others who have not been so exposed, to prevent the possible spread of the communicable disease.

*<u>**Regular Infection Control measures:**</u>
- Social distancing and hand hygiene or as recommended by the workplace

*<u>**High-risk exposure:**</u>
- A person living in the same house with COVID-19 infected patient
- A person had direct contact with a COVID-19 infected patient.
- A person had direct contact with infectious secretions of COVID-19 infected patients without taking protective measures.
- A person has face-to-face contact with a COVID-19 infected patient within 2 meters and less than 15 minutes.
- A person who was complying with social distancing (2 meters distance) in a closed environment with a COVID-19 infected patient for 15 minutes or more.
- A healthcare worker or caregiver was providing direct care for a COVID-19 infected patient, or laboratory staff handling specimens from COVID-19 infected patients without recommended PPE.
- A person who was sitting in aircraft within two seats (in any direction) of the COVID-19 case or crew members serving in the section of the aircraft where the index case was seated.

*<u>**Low risk exposure:**</u>
- A person who was in a closed area with a COVID-19 infected patient for less than 15 min or at more than 2 meters distance without physical contact.
- A person wearing face mask and had face-to-face contact with an asymptomatic COVID-19 case for less than 15 min and at less than 2 meters distance without physical contact and complying with hand hygiene.

*<u>**PCR test:**</u>
- The standard method of testing is reverse transcription-polymerase chain reaction (rate-PCR) from a nasopharyngeal swab.
- Repeat PCR test after 48 hours for indeterminate cases with initially negative PCR results.
- If repeat PCR test reported negative with initial test reported negative, consider alternative diagnosis for symptomatic patients

*<u>**Travel history:**</u>
- Travelling within 14 days from areas with COVID-19 outbreak or from restricted areas reported by the World Health Organization.

*<u>**COVID-19 treatment protocol:**</u>
- Symptomatic treatment (oxygen therapy, antipyretic, etc.)
- Consider empiric antibacterial therapy if secondary bacterial pneumonia or sepsis is suspected.
- Insufficient data to recommend either for or against antiviral or immunomodulator therapy especially in critical ill patients.
- Confirm recovery with completing two negative COVID-19 tests, done 48 hours apart with symptoms resolving

*<u>**Chest CT Scan**</u>

*<u>**High Risk Patients:**</u>
- Diabetes Mellitus(uncontrolled)
- Congestive Heart Failure
- Chronic Lung Disease
- Immune compromised
- Elderly
- Smokers
- Chronic Kidney Disease

- should not be used for covid-19 screening in asymptomatic patients, but may be considered in hospitalized patients, symptomatic cases, or in specific clinical situations.
- CT findings must be correlated with clinical and laboratory evidence of covid-19 infection.
- Confirm the diagnosis of COVID-19 by positive rt-pcr test or genetic sequencing.

Conclusion

While many people may be able to postpone daily routine appointments to avoid contacting infection, sick patient with urgent medical appointments cannot. Strategies to prepare the medical practice offices for this pandemic to optimize patient care and to lower the risk of viral transmission to healthcare workers and other patients in the clinical office should be prioritized. Herein, we present the perspective of a group of physicians who felt the need for urgent response measures to develop infection control guidance for the medical practice office.

Disclaimer

The views presented in this paper represent the views of the authors and not of the organizations they represent.

References

1 Wang D, Hu B, Hu C, Zhu F, Liu X, et al. (2020) Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 323: 1061-1069.

2 https://reliefweb.int/report/occupied-palestinian-territory/coronavirus-disease-2019-covid-19-situation-report-47-occupied

3 https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.

4 www.metapathogen.com

5 Polgreen PM, Chen E, Segre AM, Harris M, Pentella M, et al. (2009) Optimizing Influenza Sentinel Surveillance at the State Level. Am J Epidemiol 170: 1300-1306.

6 Ginsberg J, Mohebbi MH, Patel RS, Brammer L, Smolinski MS, et al. (2008) Brilliant Detecting influenza epidemics using search engine query data. Nature 457: 1012-1014.

7 Chan EH, Sahai V, Conrad C, Brownstein JS (2011) Using web search query data to monitor dengue epidemics: a new model for neglected tropical disease surveillance. PLoS Negl Trop Dis 5: e1206.

8 Wu Z, McGoogan JM (2019) Characteristics of and important lessons from the coronavirus disease, (COVID-19) outbreak in China: A summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. JAMA 323: 1239-1242.

9 Chu J, Yang N (2020) Clinical characteristics of 54 medical staff with COVID-19: A retrospective study in a single center in Wuhan, China. J Med Virol 92: 807-813.

10 Bai Y, Yao L, Wei T, Tian F, Dong-Yan J, et al. Presumed asymptomatic carrier transmission of COVID-19. JAMA 323: 1406-1407.

11 Radonovich LJ Jr, Simberkoff MS, Bessesen MT, Brown AC, Cummings DAT, et al. (2019) Respect investigators. N95 respirators vs medical masks for preventing influenza among health care personnel: a randomized clinical trial. JAMA 322: 824-833.

12 https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinic-preparedness.html

13 https://www.aafp.org/dam/AAFP/documents/patient_care/public_health/COVID-19%20Office%20Prep%20Checklist.pdf

14 https://iris.wpro.who.int/bitstream/handle/10665.1/14482/COVID-19-022020.pdf

15 Lowe S (2013) Impact of chlorine dioxide gas sterilization on nosocomial organism viability in a hospital room. Int J Environ Res Public Health 10: 2596-2605.

16 https://www.ecdc.europa.eu/sites/default/files/documents/RRA-sixth-update-Outbreak-of-novel-coronavirus-disease-2019-COVID-19.pdf

17 https://www.ama-assn.org/delivering-care/public-health/what-do-when-covid-19-enters-your-physician-practice.

18 https://www.cdc.gov/coronavirus/2019-ncov/php/public-health-recommendations.html

19 https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-%20assesment-hcp.html.

20 https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html

21 https://www.who.int/news-room/articles-detail/updated-who-recommendations-for-international-traffic-in-relation-to-covid-19-outbreak

22 https://www.covid19-treatmentguidelines.nih.gov/introduction

23 Ai T, Yang Z, Hou H, Zhan C, Chen C, et al. (2020) Correlation of chest CT and RT-PCR testing In Coronavirus disease 2019 (COVID-19) In China: A report of 1014 cases. Radiology 296: E32-E40.