

Short Communication

COVID-19 impact on the understanding of infection prevention and control measures

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Infection prevention and control (IPC) addresses factors related to the spread of infections within the healthcare setting, whether among patients, from patients to health workers, from health workers to patients, or among health workers 1. IPC includes preventive measures such as hand washing, cleaning, disinfecting and sterilizing. Other aspects include surveillance, monitoring, and investigating any suspected outbreak of infection, and its management.

The COVID-19 pandemic has had an immense impact on public and healthcare understanding of IPC. Throughout the world people and health workers are practicing improved hand-washing techniques and social distancing, and other intervention measures to prevent infections. Improved interventions in the healthcare systems have been implemented worldwide. The implications of these interventions if maintain over time will likely impact the spread of healthcare-associated infections (HAIs) 2 and antimicrobial resistance (AMR) (that will likely increase due to the heavy use of antibiotics in COVID-19 patient treatment), and should have positive impacts on global health. Momentum on the improved public knowledge regarding IPC should be maintained and reinforced. The COVID-19 pandemic has highlighted the importance of infection prevention and control as well as the necessity for supporting the understanding its practices to prevent HAIs and fight AMR.

Six aspects have been crucial during these months in controlling the COVID-19 pandemic. Health workers will not have to forget and will have to continue to apply them in their everyday clinical practice to prevent HAIs and combat AMR.

Hand Hygiene

Hand washing has been one of the cornerstones of COVID-19 infection prevention and control. However for many years, before COVID-19 pandemic, Health Organizations had reminded us of the usefulness of hand washing and despite acknowledgement of the critically important role of hand hygiene in reducing the transmission of pathogenic microorganisms, overall compliance with hand hygiene had been less than optimal in many healthcare settings worldwide.

Proper hand hygiene is the most important, simplest, and least expensive means of reducing the prevalence of HAIs and the spread of AMR. Cleaning hands healthcare workers can prevent the spread of microorganisms, including those that are resistant to antibiotics and are becoming difficult, if not impossible, to treat.

The 5 Moments for (WHO) hand hygiene approach defines the key moments when health-care workers should perform hand hygiene.

1. before touching a patient,
2. before clean/aseptic procedures,
3. after body fluid exposure/risk,
4. after touching a patient, and
5. after touching patient surroundings.

Environmental Hygiene

The sanitization of the environment has been another crucial aspect of the COVID-19 containment. It is well know that surfaces may be decontaminated by with a number of solutions (within one minute of exposure to the disinfectant for a stainless steel surface), including 62–71 percent ethanol,

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50–100 percent isopropanol, 0.1 percent sodium hypochlorite, 0.5 percent hydrogen peroxide, and 0.2–7.5 percent povidone-iodine. Other solutions, such as benzalkonium chloride and chlorhexidine gluconate, are less effective.

Environmental hygiene is a fundamental principle of infection prevention in healthcare settings 2. Contaminated hospital surfaces play an important role in the transmission of micro-organisms, including *Clostridium difficile*, and multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci. Therefore, appropriate hygiene of surfaces and equipment which patients and healthcare personnel touch is necessary to reduce exposure. Evidence supports the hypothesis that hospital can act as an important reservoir of many nosocomial pathogens in several environments such as surfaces, medical equipment and water system. Healthcare settings are complex realities within which there are many critical points. Microbial contamination can result from the same inpatients, relatives and healthcare workers. The role of environmental hygiene is to reduce the number of infectious agents that may be present on surfaces and minimize the risk of transfer of micro-organisms from one person/object to another, thereby reducing the risk of cross-infection.

Screening and Cohorting Patients

The identification and isolation of COVID-19 positive patients have been crucial for the containment of this epidemic. Contact tracing has been an important method for health authorities to determine the source of an infection and to prevent further transmission.

It is well known that early detection of multidrug-resistant organisms is an important component of any infection control program 2. There is good evidence that active screening of preoperative patients for MRSA, with decolonisation of carriers, results in reductions in postoperative infections caused by MRSA. It has been described in patients decolonised with nasal mupirocin.

Surveillance cultures for carbapenem-resistant Enterobacteriaceae (CRE) have been advocated in a number of reports and recommendations as part of an overall strategy to combat it. Active screening for CRE using rectal surveillance cultures has been shown

to be highly effective, when part of a comprehensive infection control initiative, in halting the spread of CRE in health care facilities. Isolation or cohorting of colonized/infected patients is a cornerstone of infection prevention and control. Its purpose is to prevent the transmission of microorganisms from infected or colonized patients to other patients, hospital visitors, and healthcare workers, who may subsequently transmit them to other patients or become infected or colonized themselves. Isolating a patient with highly resistant bacteria is beneficial in stopping patient-to-patient spread. Isolation measures should be an integral part of any infection prevention and control program, however they are often not applied consistently and rigorously, because they are expensive, time-consuming and often uncomfortable for patients.

Surveillance

The careful epidemiological surveillance has allowed in this epidemic to quickly recognize outbreaks. The objectives of COVID-19 surveillance at national and European level were indicated by ECDC as follows:

- Monitoring the intensity, geographic spread and severity of COVID-19 in the population in order to estimate the burden of disease, assess the direction of recent time trends, and inform appropriate mitigation measures.
- Monitoring viral changes to inform drug and vaccine development, and to identify markers of severe infection.
- Monitoring changes in which risk groups are most affected in order to better target prevention efforts.
- Monitoring the epidemic's impact on the healthcare system to predict the trajectory of the epidemic curve and inform resource allocation and mobilisation of surge capacity as well as external emergency support.
- Monitoring the impact of any mitigation measures to inform authorities so they can adjust the choice of measures, as well as their timing and intensity.

Surveillance and feedback of infection rates to clinicians and other stakeholders is a cornerstone of HAIs prevention programs. It is widely acknowledged that surveillance systems allow the evaluation of the

local burden of HAIs and AMR and contribute to the early detection of HAIs including the identification of clusters and outbreaks. Surveillance systems for HAIs are an essential component of both national and facility infection prevention and control programs. National surveillance systems should be integral to a public health system. However, recent data on the global situational analysis of AMR, showed that many regions reported poor laboratory capacity, infrastructure, and data management as impediments to surveillance.

Antibiotic Stewardship

AMR will likely increase through the heavy use of antibiotics in COVID-19 patient treatment. New and improved functional therapeutics, including antibiotics and antibiotic combinations, alternative treatments to antibiotic use, and the prevention of bacterial respiratory infections has been investigated in the context of COVID-19.

Optimal infection control programs have been identified as important components of any comprehensive strategy for the control of AMR, primarily through limiting transmission of resistant organisms among patients. The successful containment of AMR in acute care facilities, however, also requires an appropriate antibiotic use 4. Antibiotic stewardship programs (ASPs) can help reduce antibiotic exposure, lower rates of Clostridium difficile infections and minimize healthcare costs. Most antibiotic stewardship activities effect multiple organisms simultaneously and have as a primary goal the prevention of the emergence of antibiotic resistance. Thus, ASPs can largely be viewed in the context of horizontal infection prevention. Additionally, ASPs can contribute to the prevention of surgical site infections via the optimized use of surgical antibiotic prophylaxis.

Following Guidelines

During COVID pandemic, technical reports and guidelines were published by the main Health Organizations to guide healthcare facilities and healthcare providers on infection prevention and control measures for the management of suspected and confirmed cases of COVID-19 infection in healthcare settings. These documents have been used worldwide to define the principles of infections prevention and control during the epidemic.

World Health Organization and the Centers for Disease Control and Prevention have recently guidelines for the prevention of surgical site infections (SSIs) 5, 6. However, knowledge, attitude, and awareness of infection prevention and control measures are often inadequate and a great gap exists between the best evidence and clinical practice with regards to SSIs prevention. Despite evidence supporting the effectiveness of best practices, many clinicians fail to implement them, and evidence-based processes and practices that are known to reduce the incidence of SSIs tend to be underused in routine practice.

Conclusion and Recommendation

The COVID-19 pandemic has had an immense impact on public and healthcare understanding of IPC. The COVID-19 pandemic has highlighted the importance of IPC as well as the necessity for supporting the understanding its practices to prevent HAIs and fight AMR. Momentum on the improved knowledge regarding IPC should be maintained and reinforced..

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