

Progressing Infection Control Practices: Strategies For Healthcare Professionals. A New Appraisal

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1. Introduction

Modern globally effective nosocomially significant. Necessary actions to reduce this phenomenon in everyday medical practice are included in WHO guidelines and include: systematic education and training of healthcare professionals; accurate infection surveillance; using problem solving or pilot groups including epidemiologists, microbiologists, and infection control nurses; improvements in hospital infrastructure, control and organization of infection prevention and control. An important element in preventing infections is the preparation and organization by hospitals of an infection control audit in their wards, consisting in testing the hospital infection preparedness and knowledge about infection control rights of healthcare professionals. Also, it is important to evaluate the knowledge of the medical staff and their adherence to the basic principles of hospital infection control, in particular among young medics and medical students, as a group at high risk of infection. It was suggested in the meta-analyses of the students' knowledge and skills in infection control that over time, more knowledge is retained and web-based learning is often more effective ([ref: 8af385bd-7583-466b-b0c3-aea0c0e1b703]),.

Infections transmitted from the healthcare environment to patients and healthcare professionals are a significant health

problem. It is estimated that 8.7% of patients in Europe suffer from health-care associated infections, and these infections have a significant impact on morbidity and mortality of patients mentioned in (B Khanagar et al., 2020). Healthcare professionals become infected and sick as well and are often in contact with an extended network of contacts (Iuliana Bocicor et al., 2020). Reducing the prevalence of nosocomial infections begins with upgrading the infection control strategy in healthcare settings and assessing the knowledge of healthcare professionals regarding the principles of hospital infection control. There are many quite effective methods, such as teaching healthcare professionals in hospitals. However, an innovative approach is, for example, the use of mobile devices in teaching students in the field of health sciences (Yoshikawa et al., 2021).

1.1. Background and Significance

These emerging infectious agents are naturally pathogenic, and in past low pathogenicity of these agents are being converted into highly pathogenic nature on the passage from animals to man or vice-versa. Early symptoms of these emerging infectious agents match with other known infections; laboratory diagnostic facilities are very limited in developing countries and are not available in rural areas. So, secondary Health Care and teaching hospitals should have a proper aptitude and skilled manpower to successfully diagnose and treat the cases of infectious diseases. The isolation and quarantine in infectious hospitals reduce the spread of infection and mortality up to a large extent. After the diagnosis, they should have to use their integration skills to predict and prevent the future likely outbreaks (L. Sparke et al., 2021). The advances in genomics, bioinformatics and computational chemistry disciplines have brought a change in the field of research application to facilitate better understanding on the mechanism of infectious agents, their limitation, attacking site, and effect of drugs/vaccine development based on sound scientific evidence. Such approach can provide economically feasible and readily available therapeutics and preventives. However, the field R&D of infectious diseases has to be multi-disciplinary in approach to find out the final and ultimate solution in the prevention and control of emerging infectious diseases.

SARS, Chikungunya, Ebola, Zika, and Dengue were responsible for alarming health crises worldwide during the last two decades of

this Millennium. The emergence of these and other unknown infectious agents and their spread poses a threat to man, animals, and plants. Every emergence and re-emergence of infectious agents is posing a serious threat to human health and mortality. Control measures; diagnostic, therapeutic and preventive for these infectious diseases have revolutionized by the scientific society, but still are nebulous because of the peculiar nature of these agents like; dreadful, highly infectious, rapid generation of resistance may occur on the discontinuation of the single drug management, vaccine strategies are becoming more challenging, etc (Burdet et al., 2018). In order to solve these problems, national and international health, animal and plant health authorities, and agencies, international collaborators in R&D, and WHO, FAO and animal plant health organizations should jointly pool well-coordinated and integrated resources together without any hesitation to combat evil challenges jointly.

1.2. Purpose of the Appraisal

Healthcare-associated infections have been reported in hospitals, outpatient clinics, ambulatory units, and other healthcare settings since the last two decades, which have increased the rate of morbidity and mortality and the cost of healthcare systems (Alekseyev et al., 2020). In the COVID-19 pandemic situation, these issues have become more critical. Prevention of healthcare-associated infections is the main concern for healthcare professionals, especially for medical health workers. Every year, healthcare professionals face increased morbidity and mortality rates due to Healthcare-Associated Infections (HAIs). They may miss days of work as they face a high risk of acquiring a number of infectious diseases including the influenza virus, Tuberculosis, Methicillin Resistant *Staphylococcus aureus* or Hepatitis B/C which they could be infected from an infected patient at the healthcare institutions.

Improving infection control and prevention in healthcare environments through the use of innovative technologies. Introducing innovative tools, including computerized models that help in management of health of hospitalized patients, that is easy to use and flexible enough to allow adaptation to heterogenous settings and stakeholders (clinicians, epidemiologists, managers) (Iuliana Bocicor et al., 2020). In the framework of the E-learning courses for healthcare professionals has seen the development of

the “Micro- learning training solution” and of a serious game. The most promising results are those that focus on the current health crisis caused by COVID-19, both in terms of technologies and contents, with significant emphasis on interdisciplinary actions and on the capacity building of professionals in the field of infection prevention and control.

2. Understanding Infection Control

The idea of key internal boundaries—such as between general care facilities and intensive care units—could empower healthcare professionals to lower the transmission rates within their institutions (Bar-Yam with Shlomiya Bar-Yam et al., 2012). Advances in understanding of such internal and multi-scale transmission risks within healthcare systems would be crucial for developing evidence-based decision support for infection control. In the emergency environment that characterises the current COVID-19 pandemic, it is important to rely on the limited information and knowledge that is available to design cost-effective interventions to reduce transmission rates to a minimum. These ‘tunnel’ models can be used to adjudicate between conflicting information from randomised controlled trials and observational studies[^] (J. Jara, 2021).

2.1. Definition and Scope

The increase in the number/extent of antimicrobial-resistant microorganisms, whose prevention and control warrant determination of the material stakes, particularly for human health (Zhang, 2013). This underscores infection prevention and control (IPC) as the keystone to both structure and the activity of the health system. Enhanced integration of these measures in the healthcare context is therefore essential to better control these pathogens. The acquisition of strategies for reducing the multiple levels of transmission of healthcare-associated infection (HAI) in healthcare settings is the object of numerous studies. The documented experience with MDROs, encouraged in advance evidence, necessarily implies that some essential institutional organization imperatives are to be systematized in hospitalisation sectors, according to the characteristics of the departments, and, as such, are divided among the various caregivers.erequisites in terms of organisations and training of health personnel are assessed in the form of brief reminders (Iliyasu et al., 2016).

Infection prevention and control (IPC) strategies are designed to minimize the various means of healthcare-associated infection (HAI) transmission. They represent appropriate approaches with the capacity for containing nosocomial pathogens and thus enforce secured medical-care delivery. Infection control integrates preventive measures to avoid the spread of multidrug-resistant organisms (MDROs) and emerging pathogens, therefore minimizing the occurrence of hospital cross-transmissions and limiting the associated antibiotic resistance. This incorporation of measures like the limitation of cross-transmission, appropriate antimicrobial stewardship, and quality care, in addition to the optimal use of disinfectants and other biocidal agents is adaptable to interrupting any type of emerging or re-emerging pathogen such as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreaks (B Khanagar et al., 2020).

2.2. Importance in Healthcare Settings

Training for healthcare professional and its implementation could improve adherence to hand hygiene, which would contribute to continuous improvement of care in healthcare facilities. It is particularly important to establish a program to enhance adherence to hand hygiene with a higher intensity of the educational process and a continuous monitoring process. In addition to hand hygiene, one should pay special attention in healthcare settings to the implementation of, for example, the rules of application and removal of gowns and gloves, and the correct handling of invasive medical devices. Such changes in practitioner behavior would effectively prevent the development of HCAs.

Preventive comparative measurements and effective protocols are advantages in the reduction of HCAs in healthcare facilities. In this context, the correct application of permanent staff hand hygiene is crucial. Furthermore, HCAs assures services" infection control management of NHS (NHS, 2019). This is the idea that all infection control measures should be taken to prevent HCAs in healthcare facilities. The infection control committee in healthcare facilities is responsible for the monitoring and implementation of infection control measures. (Iuliana Bocicor et al., 2020). Although in general, there was minimal presence of a multi-resistant germ carrier among healthcare professionals, that does not reduce the importance of infection control practices in all types of healthcare

facilities. Enough healthcare professionals with a positive culture [5% (n=27–44)] were conducted in private clinics in particular. The study emphasized a significant association between professional frequency of hand hygiene and the prevalence of multi-resistant germ carrier in healthcare personnel.

(Iliyasu et al., 2016) (Bar-Yam with Shlomiya Bar-Yam et al., 2012). Good infection control practices can promote patient recovery and improve the health care system. Reducing the number of infections among patients can affect the overall cost of service. Infections caused by health services are major problems for all health care professionals working in healthcare facilities. As for the UK, documentation of NHS England highlights the different areas of care in which health care-associated infections (HCAIs) are of concern.

3. Historical Developments in Infection Control

Before we conclude The present account let it suffice to point out that the beginning of the 21 century is grave with the re-emergence of serious hospital infections and multiple drug resistant infections. The tough efforts of the health care professionals and nursing experts did succeed in centralization infection control as a vast venture in public health Kuhl where national system promoting career of infection control is typical. Driven by the instructor that our core lies not only in infected nations hut also in preventative as well as controlling infectious diseases, nursing institution of university clinics besides traditional hxspitals and centers from emerging as practice sites for training infected patients. To highlight a few examples, it is worth mentioning, the importance of hand hygiene, the training of infection hygiene. The cooperation with nursing scientists and health promotion of maintaining an inn,0,,11 of varying in effort, such as promotion of hawqet,aw encourage barpating, the giving of cavity prevention instructions atul helps, training hygiene inspectors anti die infection responsible persons in nursing homes.

Infection control is an essential element in any healthcare facility. It heralds the care by focusing on patients' safety and wellbeing, so ensuring the safety of the healthcare workers. This paper primarily traces the historical development of infection control over centuries, detailing its current global importance and underpinning its relevance in the modern era. A brief review will serve to underline the immense progress made in the development of

infection control over the years, led by those guarding public health in their various generations and countries. The phrase “infection control” had not been heard of in early history, prior to bacterial discovery (L. Sparke et al., 2021). With the fourth century BC recognition of purgation and disinfection, emergence of infection control began. It would otherwise be overwhelming to continually study and write about all of the valiant historical figures who led to the establishment of the present day infection control strategies (Bühler, 2007).

4. Current Challenges in Infection Control

Hospital-acquired infection has been acknowledged as a critical issue with severe implications on patient morbidity¹ and mortality (Iuliana Bocicor et al., 2017). Though a direct causality cannot be established, evidence suggests an association between HAIs and higher direct healthcare costs and impact on human and financial resources. The COVID-19 pandemic has brought unprecedented challenges in hospital care, particularly in the effort to curb nosocomial infections (J. Jara, 2021). In order to keep HAIs within acceptable levels, hospital management should provide the infrastructure needed for compliant infection control practices. Although there is a great effort from the hospitals served by infection control teams for keeping HAIs within acceptable levels, infection control programs face restrictions with patient overcrowding that can affect compliance with the rules (Nazrul Islam et al., 2020). Other challenges encountered with hospital infection control practices are communication barriers between healthcare professionals and lack of will and motivation towards compliance with personal protective equipment use and hand hygiene.

5. Key Strategies for Infection Control

Personal protective equipment is necessary for preventing health care personnel from contacting any infections or contaminants. It is any device used by health care professionals to protect themselves from infection, it is also a barrier between the skin, mucosa, nose, mouth, and the incident pathogen. Staffs should be educated about the use and disposal of such devices; use of different types of personal protective devices varies depending on the nature of the task and the condition of interaction with the patient. The use of disposable and high-quality personal protective devices is advised for minimizing the risk of transmission from an

infected source to the recipients (Pablo Caeiro & I. Garzón, 2018). These are crucial in reducing exposure to bacteria, viruses, blood, and body fluids of unknown availability. The occupational exposures can lead to both acute and chronic inflammatory-borne clinical conditions. So, staffs should be strictly adhered to strictly adhere universal precautions, and to avoid any healthcare related infections.

This educational and participatory article was written for infection control professionals who are practicing in varied settings such as home care, hospital infection control, long-term care facilities, hospitals, ambulatory care, and clinical settings. The main focus of this study was to analyze the various techniques and strategies for infection control. The review includes 'self-protection measures' that are substantial for healthcare professionals (J. Jara, 2021). The aim was to encourage healthcare professionals to insist on using these 'self-protective measures' as disposable shoe covers, disposable gloves, face shields, caps, long-sleeved gowns, and masks typically in a healthcare facility or various hazardous environments. This literature primarily discusses self-protection measures and the environmental measures used to control infections in health care settings. Training is also necessary to ensure better compliance with these 303 'best-known practices'. Checklists can be used to monitor and improve compliance with best-known infection control practices (Yu et al., 2021).

5.1. Hand Hygiene

As the next step, washing and drying the hands should be realized. The next crucial point is the capacity of the used alcohol-based solutions for killing pathogens. Healthcare professionals should use hand rubs with at least 70% alcohol for depressurizing hands effectively. Hands' rubbing is inadequate as long as alcohol rub is still liquid on their hands. HH has six steps: rubbing the palms of the hands, holding the palm of the hand over the backside of the other hand, rubbing fingers interlacing, keeping the palm of the hand over the fingers of the opposite hand, rubbing the thumb, and ensuring the rubbing of the whole hand with interlacing fingers. If healthcare workers forget one of these steps, the whole process is inadequate. For breaking the transmission in hospital infections, by which microorganisms move via healthcare personnel's hands, HH must be multi step skin care, which should be realized in a way that it covers all areas of hands, fingers as well

as nails, wrists and forearms and effectively depressurizes microorganisms.

The most important route by which healthcare-associated infections (HCAIs) are transmitted is by healthcare workers' hands, as stated by WHO (de Arriba-Fernández et al., 2021). Hand hygiene (HH) is the primary measure to prevent HCAIs. Handwashing is considered as the most effective method of hand hygiene and several studies advised the frequent handwashing for 40–60 s for the rubbing process of hands (Livshiz-Riven et al., 202). Caring patients, especially residents in child care, visiting infected individuals, and people with abnormal skin, mucous membrane, incontinence make appropriate HH of healthcare professionals important for preventing patients and healthcare professionals from infections. HH must be done with soap and water when hands are visibly dirty with body fluids. For other times, hand rubbing with alcohol-based solutions after removing jewellery and using 2–3 ml of solution would be most reasonable (T. Lash et al., 2017).

5.2. Personal Protective Equipment (PPE)

Aprons are a single-use disposable plastic material and is recommended for any invasive clinical procedures as well as exposure of the eye, nose or mouth to infectious splashes and sprays. The use of aprons corresponds to all the usual activities, gloves are recommended for other body fluids. When supplying care for contaminated patients, gowns should be worn. Spattered or sprayed with blood or other patient or environmental fluids. Clothing will be modified between each patient room, with warm and humid patients primarily requiring the removal of gowns or clothes to avoid cross-infection. Hereafter, aprons should be removed, and gloves and a face shield or goggles worn. Hand hygiene is recommended after removing PPE and before entering the next patient space (J. Jara, 2021).

(Popescu, 2019) Personal protective equipment is defined as equipment that is worn to minimize exposure to hazards such as infection. The personal protective equipment encompasses items such as gloves, aprons, masks, face visors, eye protection, gowns, surgical caps, and lead aprons. Wearing protective equipment is often the single most important act for ensuring that your actions do not have a negative impact on the patient, international guidelines and local policies must be followed when providing appropriate standard precautions (Loveday et al., 2013).

5.3. Environmental Cleaning and Disinfection

Pathogens are transferred from patients to surfaces, fabrics, and healthcare providers, leading to potential transmission events (Bar-Yam with Shlomiya Bar-Yam et al., 2012). Implementing boundary protocols can significantly reduce pathogen flow between patients and minimize the emergence of new resistant strains. Not all individuals need to go through disinfection at these boundaries; protocols can be tailored based on the level of transmission risk. Acquiring multidrug-resistant organisms (MDROs) is influenced by several factors, although the transmission of pathogens from surfaces and healthcare providers to patients still represents the most common transmission event. For this reason, standard and contact precautions should be rigorously enforced in healthcare settings. To reinforce these indications we note that pathogens are mainly transferred from patients to surfaces, such as fabric and healthcare providers, these latter then transmit the pathogens in turn to other patients <10>. Pathogen transmission between patients through healthcare worker hands is an extremely common event to be avoided. In designing infection control plans over time, understanding the transmission dynamics of different organisms will increasingly prove important. Furthermore, to limit pathogen flow between healthcare persons or between these and patients or surfaces in the hospital and in all healthcare settings with the aim of limiting recurrences of infection, it is crucial to carefully manage institutional boundaries, again including their role within the unit. Boundary plans should be drafted by experts in advance, so that they are complied with flawlessly when the need arises.. Bordering risk is estimated according to the level and to be changed during epidemic. Dividing patients for barrier nursing, so that models used will be determined and homogenize at every moment according to patient dynamic risk of contamination. Exploiting the boundary and every change of the rooms to microorganism laundering (clothes, personal objects, etc.) (Zhang, 2013).

Implement a multi-disciplinary process to monitor and improve healthcare professional adherence to recommended practices for standard and contact precautions (Mekonnen Yimer & Kebede Alemu, 2021). Focus on cleaning and disinfecting frequently touched surfaces and equipment with powerful detergents and disinfectants. Periodic microbial surveillance of the hospital environment is crucial to implement and revise infection

prevention and control measures. The high rate of nosocomial infection (NI) acquisition after 48-hours of hospitalization is likely to have tangible repercussions, with NI ranking among the leading causes of death today. Although several preventive strategies have been implemented and some results have been rather encouraging, there remains the problem of organisms that are able to both survive in the environment for prolonged periods and to resist all disinfectants used. Environmental decontamination is therefore an important goal, and it primarily aims to reduce microbial contamination within the clinical setting albeit without removing the microbial population entirely. Several strategies must be followed here, including simple decontamination (e.g., detergents), as well as physical strategies such as anti-microbial irradiation or heating. These are used for highly resistant organisms such as multidrug-resistant organisms (MDROs) or spores of *Clostridium difficile*. In general, healthcare setting decontamination should be codependent on the site concerned, as well as the likely type of pathogen to be found in these sites. Planning the periodic microbial surveillance of healthcare settings is fundamental to developing tailored infection prevention strategies. Why is there a need for more research? We believe that there is an increasing need to develop effective decontamination strategies for healthcare settings, in order to prevent the spread of several pathogens, including MDROs.

6. Technological Innovations in Infection Control

Bed occupancy rates and COVID-19 persistence determined the ventilation analytical parameters indoors in the hospital. Measured ventilation rates and persistence helped to install portable UV-C units to disinfect the rooms between patient stays and hourly. Portable UV-C mobile unit performance data tapping real-time disinfection were compared with model-based calculations. Modeling the indoor photochemistry explains the seasonal variation of the observed behavior. Outcomes from a multi-faceted approach to infection prevention and control for COVID-19 and other hospital acquired infections with technological innovations are presented (Ereth et al., 2021). A critical review of technological solutions was undertaken to systematize their applications for the prevention and control of hospital-acquired infections (HAIs). The study aimed to establish a technological platform, relevant to infection control, that would integrate the disinfection procedure with data bases of

recommendations and protocols relevant to several aspects; ranging from medical indications to the strategic information required to establish and adequately manage HAIs. The platform executes calculable estimations to detect, control and manage specific threats giving to the final users the best approach to manage an outbreak.

Healthcare-associated infections (HAIs) are emerging as significant challenges for hospital environments. Control of HAIs requires multiple measures. A multidisciplinary approach, including professional resources, evidence-based strategies and methods from basic microbiology, physics, technology and medical informatics, provide valuable tools in this ever-evolving field (Iuliana Bocicor et al., 2020). This Public Health Authorities Report aims at reviewing recent scientific evidence on infectious diseases, and subsequently to critically deliberate on potential technological solutions as well as research perspectives for infection control, focusing on different biological agent aspects and control and management measures for hospital-acquired infections (HAIs).

7. Training and Education for Healthcare Professionals

The development of the medical technology and update of the types of infectious diseases require a continuous update of infection control knowledge training programs (Ann Bryce, 2007). The education and training of new knowledge and skills are the formal and standard ways for the medical staffs to improve their work abilities, which are the cornerstone of the talents training model, especially in the prevention and control of infections. The education and training to enhance the competence of infection control in the prevention and control of infectious diseases focuses on improving the healthcare demand system, strictly requiring the implementation of hospital infection management standards and the improvement of medical institution system management structure. The education and training of knowledge involves the basic knowledge of infection discipline, nosocomial infection management model, nosocomial infection isolation management, nosocomial infection high U-value drug management, nosocomial infection air management, nosocomial infection inpatient environment and waste disposal, nosocomial infection management of medical device operation, hospital infection sample management, hospital infection investigation and management statistical analysis.

Medical staff pay more attention to infection control and the prevention of hospital-acquired infections, and provide scientific suggestions on the formulation, implementation and promotion of clinical nursing standard for infection control (Pak Chun Chau et al., 2021). High quality clinical nursing work provides experience references for the national pharmacopoeia standards, monographs, group standards and preparation display of traditional Chinese medicine. COVID-19 is a highly infectious and potentially fatal life-threatening disease. The control and prevention of COVID-19 infection in hospitals is facing severe challenges (Iuliana Bocicor et al., 2020). Different from the traditional management model, there is no specific management standard and scientific guidelines around the implementation and operation of the isolation ward, especially in the middle and late stages of the epidemic. In this way, the infection management of hospitals needs to be reformed, and the comprehensive management of hospitals has become particularly important.

8. Compliance and Adherence to Infection Control Measures

The significant contributions of infection control and prevention (ICP) to patient safety and outcomes are well documented. Health care associated infections (HCAIs) contributed to significant morbidity, mortality, and increased treatment costs. These infections are however preventable through simple but effective ICP measures such as hand hygiene, environmental cleanliness, proper sterilization of equipment, and standard and thus should always be taken into consideration during the care of patients in all levels of health-care settings (Iliyasu et al., 2016). Compliance with standard precautions among health-care workers is influenced by management attitudes and the availability of protective equipment as shown in this survey. Availability of sufficient personal protective equipment (PPE) and training of HCPs were thus identified as important interventions to improve compliance with infection control practices. Despite the high burden of HCAIs in LMICs, reports on studies focusing on infection control practices and compliance with standard guidelines were scarce prior to the outbreak of the COVID-19. However, this study demonstrated a good knowledge of standard guidelines amongst HCPs represented in the study. Infection prevention is therefore believed to be accorded high priority, and if practiced routinely can contribute substantially to reducing prevalence of HCAIs.

(J. Jara, 2021) Infection control and prevention practices can improve patient safety and outcomes by eliminating or reducing the risk of health-care associated transmission of pathogens. These practices have also been shown to be effective in preventing community transmission of infections. This review addressed the sources of, as well as strategies to improve compliance and adherence to respiratory hygiene practices among health-care providers (HCPs) in hospital emergency department (ED) settings to avert the spread of infectious diseases such as COVID-19 (Martel et al., 2012). While compliance with these precautionary practices seemed to be relatively high in studies described in this review, the actual compliance rates among the HCPs are believed to be lower, and the importance of the importance of continuous and consistent training of HCPs in infection control and prevention measures were highlighted in the review. Hospital “safety climate” as well as the payment of attention to ongoing processes and infrastructure to enhance and sustain compliance to best practices in infection control served as factors that influenced compliance with infection control protocols.

9. Evaluating the Effectiveness of Infection Control Programs

This review aimed to explore the importance of infection control programs in curbing the risk of hospital-acquired infections in healthcare settings and what still hinders these programs from working efficiently. The results indicated the need for awareness of the importance of infection control both inside and outside healthcare settings (Bar-Yam with Shlomiya Bar-Yam et al., 2012). Although more researches examining the effectiveness of infection control procedures are essential, the effect of infection control programs should be regularly evaluated to ensure their effectiveness in preventing hospital-acquired infections. Regular monitoring and evaluation of them contribute to improvements in their components and corrections of lapses, thereby preventing infections and outbreaks.

Since the implementation of an infection control program, healthcare facilities have seen significant reductions in hospital-acquired infection rates (J. Jara, 2021), there may still be issues preventing facilities from achieving complete immunity from hospital-acquired infections. These issues could be related to policies like underdressing or overdressing for sterile procedures, and even to the failure to maintain adequate disinfection or

sterilization levels. Addressing these issues may have an impact on the overall effectiveness of the infection control program. Therefore, appropriate evaluation of the effectiveness of these programs can prompt corrective measures in their components, thereby accounting for mistakes that would permit infections to happen.

10. Global Perspectives on Infection Control

Managing critically ill patients with communicable diseases such as Severe acute respiratory syndrome-related coronavirus (SARS-CoV), Middle East Respiratory Syndrome (MERS-CoV), seasonal or pandemic influenza, or other emerging infectious agents, represents several challenges to healthcare personnel (HCP) [3450e9cc-c002-43b1-82d3-bde869ec3f10]. These challenges arise from the need to protect HCP from the respiratory pathogens and the need to protect other patients from possible cross-transmission Harbor, Strike, & Davis, 2005.; Dowell et al, 2004; Hutchinson, Hosein, & Dos Santos. 2004; Brouqui et al., 2011; Fournier et al., 2015; Casas et al., 2020). To manage these challenges, some sort of infection control would have to be performed within a framework of an outbreak response plan for any communicable disease.

To address the global impact of COVID-19, significant and unprecedented public health measures have been implemented around the world, including travel bans, strict lockdowns, the mandatory wearing of masks, and other social distancing measures. In health settings, staff have to be vigilant not only to reduce the risk of SARS-CoV-2 transmission but also to consider less recognized infections that might also significantly impact patient care and contribute to high levels of morbidity and mortality. In this article, which is based upon a series of questions and answers with global infection control experts, we reflect on the impact of the pandemic and discuss the implications for infection prevention and control in healthcare (Chun-Wing LAU et al., 2004).

11. Future Directions and Emerging Trends

Overall, pathogen-specific quantitative envelope microbial burden thresholds are vital in the triage of antimicrobial exposure as well as hospitalized patients. Monitored isolation cares for patients with infectious diseases suggest that patients who feel lonely are overlooked, socially isolated and have embraced poor mental

health during and after their infections and may subsequently require additional psychiatric testing and assistance. Therapeutic direct antivirals and a medical multi-countermeasures therapy can lead to lifelong healthcare modes, including expanded, continuous contact tracing. During “lockdown”, medical support with excellent molecular architecture, telephone app notifications, social media, and email are other appropriate strategies for supporting infected patients (Padte et al., 2021).

Industry 4.0 anticipates that healthcare facilities are automated, highly autonomous, dependable, and demonstrate an advanced functioning resolution. Consequently, digital healthcare, such as eHealth, telehealth, M-health, and i-health, will be the main modes of healthcare provided by healthcare professionals. In addition, it would be at its greatest ability to interpret, visualize, and evaluate patient information as well as to swiftly deploy medication and care. Clinicians has been able to make fast decisions about preventive methods, the diagnosis, and management of hospital- and community-acquired infections more effectively than any clinical control medical microbiologist by integrating clinical information on patients with different types of health information, illustrated in telemedicine and e-ICU (Manjurul Ahsan & Siddique, 2021).

12. Conclusion and Recommendations

No state in the USA has yet approved a contact tracing app based on the Google/Apple developed Exposure Notifications API (Alekseyev et al., 2020). HCP resistance and complacency are still major barriers to change in infection control practices. A systematic approach targeting both the external challenge posed by viruses and the tenacity of human behavior, emotions and belief systems can help inculcate safe practices in hospital care centres. The difference of opinion among HCPs and their COVID-19 protective practice variance is somewhere the result of not knowing the full spectrum of clinical presentation of COVID-19, lack of experience in infection control and consensual guidelines to follow during practice (Yu et al., 2020). A salient feature of the influencer transformational effect is that decorated nurseries do not always manifest with decorated practices of infection control in trainees. However, we know that behavioural choices can be altered by systematic training interventions. Behavior challenges would not have manifested if HH trainers were more conscious in

a competency-based training delivery, which moves away from lay concepts of infection control involving hand washing or antimicrobial stewardship alone.

Although COVID-19 has rekindled a worldwide interest in mHealth, not many apps are available. A systematic and standardized approach to design, develop, and validate mHealth interventions is needed to effectively cope with pandemics and future health events that overwhelm healthcare systems. In this exploratory review, most of the 53 popular apps have a rather homogeneous scope, i.e. information provision, symptoms tracker, self-assessment and test booking (Nazrul Islam et al., 2020). Our past experience fighting SARS-CoV, MERS-CoV, Ebola and H1N1 has taught us that reaching out to the people through health care professionals (HCPs) or trained volunteers carrying smartphones and facilitating the follow-ups by a team of mHealth designers can truly bring about the needed behavioral changes.

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