International Journal of Multidisciplinary and Current Educational Research (IJMCER)
ISSN: 2581-7027 ||Volume|| 2 ||Issue|| 4 ||Pages|| 72-75 ||2020||

The Use of Standard and Additional Precautions in Reducing the Risk of Nosocomial Infections in the Context of the Covid-19 Pandemic

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ABSTRACT : Dealing with suspected or confirmed cases of COVID-19, Physical distancing, hand hygiene, universal masking, and respiratory etiquette are the most important factors that shall decrease the chance of transmission of the infection (GDIPC, 2020). In addition, Nosocomial epidemics (Richards, CL. & Jarvis WR. 1999) continue to be a major threat to patients. Bacteria are the most common pathogens causing reported nosocomial infections. Mycobacteria, fungi and viruses are reported less commonly and epidemics due to toxins, while reported infrequently, appear to be increasing in frequency and importance. Hospitals remain the most common healthcare facilities reporting nosocomial epidemics although more epidemics are being reported from out – of – hospital settings. Many nosocomial epidemics occur due to contaminated water, solutions, medical products or devices and increasingly involve emerging antimicrobial / antibiotic resistant pathogens. Interventions to control and prevent nosocomial infections are varied and to some extent depend on the characteristics of the pathogens and setting. Standard precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infections in the hospital. It has been estimated (Sax, H. et al. 2001) that 10 % of a hospital stay is a result of nosocomial infections; if universal precautions work as expected, they might have a significant impact on reducing these. These infections create a great morbidity and some mortality, and even a small benefit would be significant. Re-engineering around needle use in the hospital is clearly the most likely area to produce concrete results, because needlesticks are overwhelmingly the greatest source of infection, but this has not been encouraged to the degree it could be, even with systems already developed. Nosocomial infections are more important both as public health issues and as health care provider prevention issues. This paper explores standard and additional precautions in the control of nosocomial infections.

KEYWORDS: Standard precautions; COVID-19; infection control practitioner; nosocomial infection (NI); Hospital acquired infection (HAI); healthcare providers; Hospital Infection Control Practices Advisory Committee (HICPAC).

I. INTRODUCTION

STANDARD AND OTHER PRECAUTIONS IN THE CONTROL OF NOSOCOMIAL INFECTIONS

During the Covid-19 Pandemic the role of infection control practitioner is limited to inform the health care facility administration and notifying the security authorities if necessary, while public health officials take over access to the patient and follow-up contacts, including new contacts after escape, based on the latest international guidelines, policies, and national protocols in Saudi Arabia (GDIPC, 2020). However, Garner SJ (2002) claimed that there are two tiers of Hospital Infection Control Practices Advisory Committee (HICPAC) isolation. precautions. In the first, and the most important tier are those precautions designed for the care of all patients in hospitals, regardless of their diagnosis or presumed infection status. Implementation of these "Standard Precautions" is the primary strategy for successful nosocomial infection control. In the second tier are precautions designed only for the care of specified patients. These additional "Transmission – Based Precautions" are for patients known or suspected to be infected by epidemiologically important pathogens spread by airborne or droplet transmission or by contact with dry skin contaminated surfaces. They may be combined for diseases that have multiple routes of transmission. Standard Precautions (SP) synthesize the major features of (HICPAC) Universal Precautions (Blood and Body Fluid Precautions and precautions designed to reduce the

Risk of transmission of pathogens from moist body substance and applies them to all patients receiving care in hospitals, regardless of their diagnosis or presumed infection status. According to recent studies, symptoms usually appear on Day 6–5 after exposure, which is called the incubation period (the time between exposure to the virus and symptom onset) that may last up to 14 days, so the source of infection is mostly someone who he has contacted 5 to 6 days before symptoms started, up to 14 days.

II. RECOMMENDED ROUTINE INFECTION PREVENTION AND CONTROL (IPC) PRACTICES DURING THE COVID-19 PANDEMIC

Centers for Disease Control and Prevention (CDC) recommends using additional infection prevention and control practices during the COVID-19 pandemic, along with standard practices recommended as a part of routine healthcare delivery to all patients. These practices are intended to apply to all patients, not just those with suspected or confirmed SARS-CoV-2 infection. Healthcare Personnel (HCP) should perform hand hygiene before and after all patient contact, contact with potentially infectious material, and before putting on and after removing PPE, including gloves. Hand hygiene after removing personal protective equipment (PPE) is particularly important to remove any pathogens that might have been transferred to bare hands during the removal process.

STANDARD PRECAUTIONS

1. Blood
2. All body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood
3. Non-intact skin
4. Mucous membrane

Regardless (Donald, E. et al, 1997) of the specific clinical setting in the health care facility, it is clear that better protection of all personnel and patients is an appropriate objective in the current environment. Better protection through improved personal protective equipment (PPE) and modification of operational practices is essential. A prompt response to blood contact when it occurs is likewise appropriate. Given the different risks (Bell DM, et al. 1995) exposure among different operative procedures, adoption of procedure – specific precautions promises to be the most effective method of infection control and prevention. Potential interventions strategies include:

1. Administrative control: members require training in infection control procedures. Unnecessary personnel should not be present.
2. Protective garments: members at risk for blood exposure should be required to double globe and wear water – impermeable footwear, gowns, and face protection. The specific barrier garment should be selected to afford a level of protection adequate to prevent the expected sources of exposure associated with each procedure.
3. Changes in techniques: members should be trained in the “no touch” technique. Instruments rather than fingers should be used to handle sharps and to protect adjacent viscera from injury by suture needles and other sharps. Personnel should be encouraged to periodically change soiled gloves and garments during the procedure to decrease the risk of blood exposure. Transfers of sharps should be accomplished without risk of injury to the recipient, using “neutral zones” transfer basins, and / or verbal announcements when transfer is to occur.
4. Improved engineering: industrial engineers (Fecteau, D. 1995) must design safer scalpels, needles, and intravenous catheters and tear – resistant gloves. Each HCW must continue to work together to solve the problem of infection control in the workplace. These strategies were substantiated by Hamory. (1993).
   Implementing behavior modification (Hamory, 1993) strategies in the workplace that are designed to reduce the risk for occupational exposures to bloodborne pathogens remains the cornerstone of all prevention strategies. Healthcare workers:

1. Should be made aware of the risks present in the workplace
2. Should be educated about the magnitude of these risks
3. Should be trained in strategies shown to be effective in reducing the risk for exposure (Standard Precautions)
4. Should be provided with training designed to assist in the modification of procedures intrinsically associated with occupational risks
5. Should be provided with instruments and devices that have been rendered safer though technologically advanced

Adequate (Pittet D. & Boyce, JM, 2001) disinfection of hand after patient contact is among the cornerstones to limit the spread of antibiotic – resistant pathogens. Unfortunately, adherence to this measure rarely exceeds 50 % usually with physicians performing worse than nurses in this regard. Alcohol-based hand rubs are preferable to washing hands with soap and water because alcohol – containing compounds are fast acting, have an optimal antimicrobial spectrum and do not require the use of basins. Moreover, (Gerbierding, et al. 1995) alcohol – based solutions caused less skin irritation and dryness of hands as compared with unmedicated soap. Only a visibly soiled hands should be washed with soap and water. Surveillance (Emmerson, 1995) is an essential component of the prevention and control of nosocomial infections and this consists of collecting, tabulating, analyzing and disseminating of information on the occurrence of HAIs. Effective surveillance systems are essential for the rapid detection of outbreaks. As demonstrated by a series of studies, a variety of sources, including hospital water systems, sterilization and disinfection of medical devices, intravenous therapy practices, and antimicrobial prescribing patterns, can contribute to or cause nosocomial infection. Constant vigilance and expansion of infection control activities in hospitals and other health care settings are essential if we are to prevent and control nosocomial infections / epidemics. Outbreaks (Bonten, 1995) and high levels of endemic prevalence of resistant pathogens are usually combated with a series of infection control measures, such as changes in antibiotic policy, enforcing hand disinfection practices, isolation of patients, cohorting nurses, and using gloves and gowns. Cohorting of nurses and strict isolation of colonized patients have been proven to be effective control measures for various microorganisms. Antibiotic cycling is a strategy to reduce antibiotic resistance by temporarily withdrawing an antibiotic or class of antibiotic from use in order to allow resistance rates to decrease or to remain stable. Gerberding, JL, et al. (1995) claimed that the Milwaukee educational programs did not reduce the incidence of cuts and needlesticks. Double gloving appears to be effective in reducing blood contamination of fingers but may not reduce the incidence of blood exposure from percutaneous injuries. If percutaneous injuries are more likely to result in disease transmission than simple contamination, the most effective strategy to reduce disease transmission might be directed at individual healthcare workers with high percutaneous injury rates. Adherence to double gloving appears desirable, although the actual benefits remain to be defined. Moreover, facemasks and cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or anyone who is unconscious, incapacitated or otherwise unable to remove the mask without assistance.

III. CONCLUSION

Physical distancing, hand hygiene, universal masking, and respiratory etiquette are the most important factors that shall decrease the chance of transmission of the infection and confirmed cases of COVID-19 (GDIPC, 2020). Surveillance strategies flounder without accurate and fast microbiological services. It is now no longer satisfactory to describe organisms in general terms, for example coliforms; good surveillance should be supported by good laboratory services. HAIs increase morbidity, mortality and length of hospital stay. The latter increases hospital costs alarmingly; new strategies are needed to prevent HAIs in order to reduce this. We will never be able to eliminate (Donald E, 1995) such risks entirely from the health care workplace, a multifaceted approach to the management of these risks throughout the hospital environment and particularly in risk – intense environments (Critical care units) will likely create a safer milieu and climate. Such an improved environment will clearly be necessary as we continue to strive to provide optimal care for all patients, irrespective of their nosocomial infection status.

ACKNOWLEDGEMENTS

The authors declare that there is no competing interests and we thanks the referee for providing constructive feedback.

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