Infection control

Babu Banarasi Das University, Lucknow, Uttar Pradesh

Dr. Ankita Singh
drankitasinghbaghel@gmail.com

Dr. Anuradha P.
anuradhap1963@gmail.com

Babu Banarasi Das University, Lucknow, Uttar Pradesh

Dr. Sahana S.
drsahana_s@gmail.com

Dr. Sugandha Agarwal
drsugandhaagarwal@gmail.com

Babu Banarasi Das University, Lucknow, Uttar Pradesh

Dr. Manu Narayan
drmanu_n@yahoo.co.in

Babu Banarasi Das University, Lucknow, Uttar Pradesh

Dr. Shweta Singh
drshweta2005@gmail.com

Babu Banarasi Das University, Lucknow, Uttar Pradesh

ABSTRACT

Hospital Acquired Infections (HAI) are a major global safety concern for both patients as well as healthcare professionals. Many factors promote infection among hospitalized patients – decreased immunity among patients; increasing variety of medical procedures and invasive techniques creating potential routes of infection; and the transmission of the drug-resistant bacteria among the crowded hospital populations where poor infection control practices can facilitate transmission. Dental care providers, in particular, are also at an increased risk as they are providing care by working with sharp instruments at very high speeds and limited access in an environment that is bathed in saliva and, in many instances, blood. Dental care professionals are at high risk of cross-infection while treating patients. The dental clinic is an environment where disease transmission occurs easily. Prevention of cross-infection in the dental clinic is, therefore, a crucial aspect of the dental practice, and dental clinic workers must adopt certain basic routines while practicing.

Keywords — Infection Control, Hospital acquired infection, Infection transmission, Sterilization

1. INTRODUCTION

Health care-associated infections are those infections that are transferred to patients, while they are in the healthcare delivery system which includes all the procedures which are associated with diagnosis, treatment, care, and rehabilitation. These infections were previously called the hospital or nosocomial infections. They are determined by a number of factors related to the patients themselves, the procedures they are given, the organisms that are causing the disease, and the area where the treatment is taking place. Patients have an increased chance of catching the infection because they are already weakened because of the disease, the chances increase more if the patients are elderly. Immunity weakens with old age and the functions of vital organs are reduced. Lifestyle factors such as poor quality food, lack of exercise, and tobacco and alcohol abuse also play a role. Complicated procedures such as surgery and insertion of catheters that break down the natural barriers of skin and mucous membranes predispose for the health care-associated infections.

Infection control forms an important part of practice for all health care professions and remains one of the most cost-beneficial medical interventions available. Infection control is a major issue in medicine and dentistry because of the increase in the transmission of communicable diseases. Both dental personnel and patients are always at risk of communicating diseases during treatment. The effective use of infection control procedures in the dental office prevents the cross-contamination that may extend to the dentist, dental staff, dental technician and patients. Effective and efficient infection control protocol in the dental office is essential for the safety of patients and to ensure that productivity does not suffer. Knowing the ways communicable (infectious) diseases are transmitted is important for implementing proper infection control and prevention. There are a number of routes of transmission, including contact, droplet (respiratory secretions). Most of the respiratory illnesses are spread through contact, droplets, or through the air. The most frequent mode of transmission of associated infections is the contacts.

2. SOURCES AND ROUTES OF TRANSMISSION OF INFECTION

Contact is the most frequent mode of transmission of associated infections. There are two major subgroups:

(a) Direct-contact transmission and
(b) Indirect-contact transmission.
2.1 Direct-contact transmission
It involves a direct person-to-person contact, which results in the physical transfer of microorganisms from an infected or colonized person to a susceptible person, which might occur in the course of patient care activities.

2.2 Indirect-contact transmission
It involves contact of a susceptible individual with contaminated objects such as instruments, needles, or dressings contaminated hands (that are not washed); or gloves that are not changed between patients.

3. MODE OF TRANSMISSION
(a) Respiratory
(b) Gastrointestinal
(c) Skin
(d) Genital
(e) Intrauterine or transplacental
(f) Urinary
(g) Personal contact
(h) Water and food
(i) Arthropod borne

4. ROUTES OF TRANSMISSION
(a) Blood: Splashed on medical employee. Blood, internal fluids and genital fluids do contain blood-borne pathogens for example:
   Human Immunodeficiency Virus (HIV)
   Hepatitis B Virus (HBV)
   Hepatitis C Virus (HCV)
   Cytomegalovirus (CMV)
(b) Internal Body fluids (cerebrospinal, pericardial, pleural, peritoneal, synovial, amniotic)
(c) Genital fluids (vaginal, prostatic secretions, semen)
(d) Sexual contact
(e) HBV, HSV can be transferred to the newborn during delivery.
(f) Transplacental transfer of blood: syphilis.
(g) Secretions like saliva, nasal discharge, sweat, tear and breast milk
(h) Excretions: Urine (schistosomiasis, leptospirosis)
(i) Feces (numerous enteropathogens)
(j) Mucosal membranes (nasal, oropharyngeal, rectal, genital)
(k) Skin, squames
(l) Tissue: Transplant, grafts, blood transfusion, blood components
(m) Bites etc

5. MEANS OF TRANSMISSION IN HEALTH CARE ASSOCIATED WORKERS
(a) Among patients and health care personnel, microorganisms are spread to others through four common routes of transmission
(b) Contact (direct and indirect)
(c) Respiratory droplets
(d) Airborne spread
(e) Common vehicle

6. COMMON INFECTIOUS DISEASES ENCOUNTERED IN DENTISTRY
6.1 Viral infections
- Herpes Simplex Virus
- Varicella Zoster Virus
- Epstein - Barr virus
- Human Herpes Virus 6 (HHV6)
- Influenza, Rhino and Adenoviruses
- Rubella (German measles)
- Coxsackie Virus
- Hepatitis B Virus (HBV)
- Hepatitis C Virus (HCV)
- Human Immunodeficiency Virus (HIV)

6.2 Bacterial infections
- Tuberculosis
- Legionellosis
- Syphilis
7. STANDARD PRECAUTION AND SAFE PRACTICES
Infection control practices can be divided into two groups,
(a) Standard precautions;
(b) Additional (transmission-based) precautions

7.1 Standard Infection Control Precautions (SICP)
These precautions are such designed to prevent cross-transmission from the available recognised and the unrecognised sources of infection or the unidentified sources. These sources of infection may include blood and other body fluid secretions or the excretions and any equipment or items available in the healthcare care environment that is likely to be contaminated. SICPs are necessary to be followed to ensure the safety of patients as well as healthcare personnel and those who visit the care environment. To reduce the risk of disease transmission in the health care setting, use the following Standard Precautions.

- Wash hands immediately with soap and water before and after examining patients and after any contact with blood, body fluids and contaminated items. Whether or not gloves should be worn. Soaps containing an antimicrobial agent are recommended.
- Wear the clean, thick gloves anytime there is contact with any of the potential contaminants which can include blood, body fluids, mucous membrane, and broken skin. Change gloves between each patient and on the same patients between each task. Before going to another patient, remove gloves promptly and wash hands immediately then put on the new gloves.
- Wear the mouth mask, protective eyewear and the surgical gown/ aprons during any patient-care activity in which blood splashes or sprays of body fluids are likely to occur.
- Handle needles and other sharp instruments safely. Do not break the used needles.
- Make sure the contaminated equipment or instruments are not reused with another patient until it has been cleaned, disinfected, and sterilized properly. Dispose of the non-reusable needles, syringes, and other sharp patient-care instruments immediately after use.
- Clean and disinfect touched surfaces including beds, dental chairs, patient examination tables and bedside tables regularly.
- Clean and disinfect soiled linens and launder them safely. Avoid directly contacting the items which are soiled with blood and body fluids.
- Place the patient with contaminated blood or body fluids that can contaminate surfaces or other patients in an isolation room or area.

7.2 Additional (transmission-based) precautions
These are the precaution taken in addition to the standard precautions.
(a) Airborne precautions
(b) Droplet precautions
(c) Contact precautions

7.3 Hand hygiene
Hand hygiene procedures include the use of alcohol-based hand rubs (containing 60-95% alcohol) and hand washing with soap and water. Alcohol-based hand rub is the preferred method for decontaminating hands.

7.3.1 Indications for hand hygiene
Always perform hand hygiene in the following situations:
- Before you touch a patient, even if gloves will be worn.
- Before exiting the patient’s care area after touching the patient or the patient’s immediate environment.
- After the contact with blood, body fluids or excretions, or wound dressings.
- Prior to the performance of any aseptic task.
- If your hands are to be moved between contaminated body site and clean site during the patient care.
- After the removal of gloves.

7.4 Personal Protective Equipment (PPE)
The Personal Protective Equipment’s refers to the protective clothing, the use of goggles, or other garments or equipment which are designed to protect the wearer’s body from the acquired injury or infection.
Different types of personal protective equipment:
(a) Gloves
(b) Aprons
(c) Face and eye protection

7.5 Sharp disposal
The handling and disposal of sharp needles and other sharp instruments which are used in patient care should form part of an overall strategy of the clinical waste disposal which will protect staff, patients and visitors from getting exposure to the blood borne pathogens.

All waste containers are to be color coded and identified. Waste collection times should be routine. All bags should be held away from the body by the closed top of the bag and placed directly into a mobile garbage bin or trolley where waste bags are sealed and stored pending collection, they should be in a secure place with restricted access.
8. STERILIZATION AND DISINFECTION

- **Disinfection**: Disinfection is the procedure that eliminates most or all pathogenic microorganisms with the exception of bacterial spores.
- **Sterilization**: sterilization refers to elimination or destruction of all forms of life either vegetative or spores by a chemical or physical mean.14

According to the Centers for Disease Control, the instruments used in dentistry are classified into three categories depending on the risk it has for the transmission of infection.

The classifications of Critical, Semicritical and Noncritical are based on the following criteria:

(a) **Critical instruments** in dentistry are those instruments which are used to penetrate the soft tissue or bone, or which enter into or contact the bloodstream or other normally sterile tissue. They should be sterilized after each use in patients. The Sterilization of critical instruments is achieved by steam under pressure (autoclaving), dry heat, or the heat/chemical vapour. Critical instruments mainly include forceps, scalpels, bone chisels, scalers and surgical burns.

(b) **Semi-critical instruments** in dentistry are those instruments that do not penetrate the soft tissues or bone but contacts the mucous membranes or skin; it includes instruments such as mirrors, reusable impression trays and amalgam condensers. The sterilization of these instruments is necessary after every use. In some cases, however, sterilization is not feasible for these instances, high-level disinfection is appropriate.

(c) **Non-critical instruments** in dentistry are those instruments that come directly into contact only with the intact skin like the external components of x-ray heads, the blood pressure cuffs and pulse oximeters. They have a low risk of transmitting infection; they can be reprocessed between patients by intermediate-level or low-level disinfection. 15,16

8.1 Agents used in sterilization

8.1.1 Physical agents

(a) Sunlight
(b) Drying
(c) Dry heat: flaming, incineration, hot air
(d) Moist heat: the included process of pasteurization, boiling, steam under high pressure and steam under normal pressure.
(e) Filtration: candles asbestos pads, membranes
(f) Radiation
(g) Ultrasonic and sonic vibrations

8.1.2 Chemical agents

(a) Alcohols: ethyl, isopropyl, trichlorobutanol
(b) Aldehydes: formaldehyde, glutaraldehyde
(c) Dyes
(d) Halogens
(e) Phenols
(f) Surface-active agents
(g) Metallic salts

8.1.3 Gases

(a) Ethylene oxide,
(b) Formaldehyde,
(c) Beta-propiolactone.

9. CONCLUSION

The occurrence of the life-threatening infections such as the Severe Acute Respiratory Syndrome (SARS) and reoccurrence of the infectious diseases like plague and tuberculosis have resulted in highlighting the need for efficient infection control programmes in all health care settings. An infection control programme puts together the various practices which, used to be used appropriately, and the use of these practices restrict the spread of infection. Any breach in the practice of infection control protocols results in the transmission of infection from patients to health care workers, other patients and attendants. Therefore it is important for all health care workers, patients, their family members, friends and close contacts to follow through the infection control guidelines strictly.

10. REFERENCES

[6] Massachusetts Department of Public Health” Infection Prevention And Control Information Sheet”

© 2019, www.IJARIIT.com All Rights Reserved
[12] Dr. S. Venkatesh, Dr. Sunil Gupta, Dr. Sarika Jain, Dr. Padmini Srikantiah, Dr Rajni Gaind, “Hospital Infection Prevention And Control Guidelines” Page No 16,17
[13] Partnership in care training (PaCT)” personal protective equipment” page no2
[16] Sridhar Rao” Sterilization and Disinfection