Ministry of Health & Family Welfare
Government of India

World Health Organization
India

National Training of Trainers for

COVID-19

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Environmental cleaning, disinfection and bio-medical waste management

Learning Objectives

- Environmental cleaning and Disinfection
  - Environmental decontamination
  - Cleaning of medical equipment
  - Cleaning soiled bedding, towels and clothes from patients with COVID-19
  - Cleaning and disinfection of occupied patient rooms
  - Cleaning and disinfection after patient discharge and transfer
  - Prevent environment contamination: contain respiratory secretions
- Bio-medical waste management

Environmental Cleaning and Disinfection

Environmental Decontamination (1)

General Principles

- Healthcare environment contains a diverse population of microorganisms, but only few are significant pathogens
- Microbiologically contaminated surfaces can serve as reservoirs of potential pathogens
- Contaminated surfaces not directly associated with transmission of infections to either staff or patients
- Transfer of microorganisms from environmental surfaces to patients is mostly via hand contact with the surface
- Hand hygiene is important to minimize the impact of this transfer
- Cleaning and disinfecting environmental surfaces is fundamental in reducing healthcare-associated infections

Environmental Decontamination (2)

- COVID-19 virus can potentially survive in the environment for several hours/days
- Premises and areas potentially contaminated with the virus to be cleaned before their re-use
- Products containing antimicrobial agents known to be effective against coronaviruses may be used
- Established cleaning strategies to be used
  - Remove the majority of bioburden, and
  - Disinfect equipment and environmental surfaces

Environmental Decontamination (3)

- Housekeeping surfaces can be divided into two groups
  - Those with minimal hand contact (e.g. floors and ceilings)
  - “High touch surfaces” – those with frequent hand-contact
- High touch housekeeping surfaces in patient-care areas should be cleaned and/or disinfected more frequently
  - Doorknobs
  - Bedrails
  - Light switches
  - Wall areas around the toilet in the patient’s room
  - Edges of privacy curtains

Cleaning/disinfection of medical equipment (1)

- Wear gloves when handling and transporting used patient care equipment
- Before removing equipment from patients room, medical equipment must be disinfected
- Non-critical medical equipment:
  - E.g., stethoscopes, blood pressure cuffs, dialysis machines and equipment knobs and controls
  - Usually only require cleansing followed by low- to intermediate-level disinfection, depending on the nature and degree of contamination

Cleaning/disinfection of medical equipment (2)

- In absence of manufacturer instructions regarding cleaning/disinfection of equipment
  - Ethyl alcohol or isopropyl alcohol (60%–90%, v/v) often used to disinfect small surfaces (rubber stoppers of multiple-dose medication vials, and thermometers) and occasionally external surfaces of equipment (stethoscopes and ventilators)
- Alcohol causes discoloration, swelling, hardening and cracking of rubber and certain plastics after prolonged and repeated use
  - Cover mattresses for easier disinfection

Cleaning/disinfection of medical equipment (3)

- Barrier protection of difficult to clean surfaces and equipment is useful, especially if these surfaces are
  - Touched frequently by gloved hands during the delivery of patient care
  - Likely to become contaminated with body substances, or
- Impervious-backed paper, plastic or fluid-resistant covers are suitable for use as barrier protection
- Remove and discard coverings with gloved hands
- Perform hand hygiene after ungloving
- Cover these surfaces with clean materials before the next patient encounter

Cleaning/disinfection of medical equipment (4)

Area/Items	Inputs	Process	Method/ procedure
Stethoscope	Alcohol-based rub/Spirit swab	Cleaning	○ Should be cleaned with detergent and water ○ Should be wiped with alcohol based rub/spirit swab before each patient contact
BP cuffs & covers	Detergent Hot water	Washing	○ Cuffs should be wiped with alcohol- based disinfectant and regular laundering is recommended for the cover
Thermometer	Detergent and water Alcohol rub Individual thermometer holder	Cleaning	○ Should be stored dry in individual holder ○ Clean with detergent and tepid water and wipe with alcohol rub in between patient use ○ Store in individual holder inverted ○ Preferably one thermometer for each patient
Injection and dressing trolley	Detergent and water Duster Disinfectant (70% alcohol)	Cleaning	○ To be cleaned daily with detergent and water ○ After each use should be wiped with disinfectant

Cleaning soiled bedding, towels and clothes from patients with COVID-19 (1)

- Clean the laundry and surfaces in all environments in which COVID-19 cases receive care – at least once a day and when a patient is discharged
- Hospital disinfectants:
  - 70% ethyl alcohol for small areas – reusable dedicated equipment (e.g. thermometers)
  - Sodium hypochlorite at 0.5% (equivalent 5000 ppm) for surface disinfection
- Individuals/staff dealing with soiled bedding, towels and clothes from patients with COVID-19 should:
  - Wear appropriate PPE – heavy duty gloves, mask, eye protection (goggles/face shield), long-sleeved gown, apron (if gown is not fluid resistant), and boots or closed shoes
  - Never carry soiled linen against body; place soiled linen in a leak-proof bag or bucket
  - Perform hand hygiene after blood/body fluid exposure and after PPE removal

Cleaning soiled bedding, towels and clothes from patients with COVID-19 (2)

- Soiled linen should be placed in clearly labelled, leak-proof bags or containers, carefully removing any solid excrement and putting in covered bucket to dispose of in the toilet or latrine
- Washing machine
  - Wash at 60-90°C with laundry detergent followed by soaking in 0.1% chlorine for approximately 30 minutes and dried
- No machine washing
  - Soaked in hot water with soap/detergent in a large drum
  - Use a stick to stir and avoid splashing
  - Empty the drum and soak linen in 0.1% chlorine for approx. 30 minutes
  - Rinse with clean water and let linens dry fully in the sunlight

Cleaning and disinfection of occupied patient rooms

- Designate specific well-trained staff for cleaning environmental surfaces
- Cleaning personnel should wear PPE and must be trained on proper use of PPE and hand hygiene
- Define the scope of cleaning to be done each day
- Use a checklist to promote accountability for cleaning responsibilities
- Keep cleaning supplies outside the patient room

Cleaning of Housekeeping surfaces and eating utensils

- Housekeeping surfaces:
  - Require regular cleaning and removal of soil and dust
  - Personal protective equipment (PPE) used during cleaning and housekeeping procedures
  - Need to be cleaned only with soap and water or a detergent/disinfectant, depending on the nature of the surface and the degree of contamination
- Dishes and eating utensils used by a patient with known or suspected infection
  - No special precautions other than standard precautions
  - Wear gloves when handling patient trays, dishes and utensils

Spill management

- Worker assigned to clean the spill should wear gloves and other personal protective equipment
- Most of the organic matter of the spill to be removed with absorbent material
- Surface to be cleaned to remove residual organic matter
- Use disinfectant: hypochlorite
  - 1% for small spills
  - 10% for large spills

Cleaning and disinfection after patient discharge or transfer

- Clean and disinfect all surfaces that were in contact with patient or may have become contaminated during patient care
- Do not spray or fog occupied or unoccupied rooms with disinfectant – potentially dangerous practice that has no proven benefits

Prevent environment contamination: contain respiratory secretions (1)

Ensure early recognition and prevention of transmission of the respiratory virus at the initial encounter with a healthcare setting

- Post **visual alerts** (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physicians' offices, outpatient clinics) instructing patient and the persons who accompany them to:
  - Inform healthcare personnel of symptoms of a respiratory infection when they first register for care, and
  - Practice respiratory hygiene/cough etiquette

Respiratory hygiene/cough etiquette

- All persons with signs and symptoms of a respiratory infection (regardless of presumed cause) must follow respiratory hygiene/cough etiquette
  - Cover the nose/mouth when coughing or sneezing
  - Use tissues to contain respiratory secretions
  - Dispose of tissues in the nearest waste receptacle after use
  - Perform hand hygiene after contact with respiratory secretions and contaminated objects/materials

Prevent environment contamination: contain respiratory secretions (2)

Ensure availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:

- Provide tissues and no-touch receptacles (i.e. waste container with foot-operated lid or uncovered waste container) for used tissue disposal
- Provide conveniently located dispensers of alcohol-based hand rub
- Provide soap and disposable towels for hand washing where sinks are available

Prevent environment contamination: contain respiratory secretions (3)

Masking and separation of persons with symptoms of respiratory infection

- During periods of increased respiratory infection in the community, offer triple-layer masks to persons who are coughing
- Encourage coughing persons to sit at least 3 feet (1 metre) away from others in common waiting areas

Droplet precautions

- Healthcare workers should practice droplet precautions, in addition to standard precautions, when examining a patient with symptoms of a respiratory infection
- Droplet precautions should be maintained until it is determined that they are no longer needed

Biomedical Waste Management

Bio-Medical Waste Management Rules 2016, amended 2018 & 2019

- Environment (Protection) Act, 1986
- Apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle any bio-medical waste
- "**Occupier**" means a person having administrative control over the institution and the premises generating bio-medical waste
- Responsibility of every occupier – safe and proper identification, handling, storage and disposal of biomedical waste from laboratories and related facilities

Segregation, packaging, transportation and storage

- Untreated bio-medical waste should not be mixed with other wastes
- Bio-medical waste shall be segregated into containers or bags at point of generation (as per BMWM Rules 2016)
- Bio-medical waste containers or bags should be prominently labelled with biohazard symbol (and other details as per Rules)
- Untreated bio-medical waste must not be stored >48 hrs
- Ensure no spillage occurs during handling and transit of bio-medical waste

Yellow bag

- Anatomical waste – human, animal body parts & tissue
- Soiled waste – items contaminated with blood or body fluids – like dressings, cotton swabs and bags containing residual blood/blood components
- Chemical waste – chemicals used in production of biologicals
- Microbiology, biotechnology and other clinical laboratory waste (to be pre-treated by autoclaving before discarding):
    - Blood bags
    - Laboratory cultures
    - Stocks or specimens of microorganisms
    - Live or attenuated vaccines
    - Human and animal cell cultures
- Discarded linen contaminated with blood or body fluid including mask and gown

Red Bag

- Contaminated recyclable waste
- Waste from disposable items:
  - Tubing and bottles
  - Intravenous tubes and sets
  - Catheters and urine bags
  - Syringes (without needles), vacutainers
  - Gloves
- Plastic petri-plates containing infectious material to be pre-treated by autoclaving and discarded in red bags

Translucent white box

- Puncture, leak and tamper proof
- Sharps waste (used, discarded and contaminated metal sharps)
  - Needles
  - Syringes with fixed needles
  - Needles from needle tip cutter or burner
  - Scalpels
  - Blades
- Any other contaminated sharps

Blue box

- Or containers with blue coloured marking
- Puncture and leak proof boxes
- **Glassware**
  - Broken or discarded glass including medicine vials & ampoules (except those contaminated with cytotoxic waste)
  - Broken or discarded contaminated glass

Labelling of BMW bags

Label should be non-washable and prominently visible

Waste category Number …….. Waste quantity…… Sender's Name and Address: Phone Number …….. Fax Number …… Contact Person …….. In case of emergency please contact : Name and Address : Phone No.	Day …… Month …… Year …… Date of generation …… Receiver's Name and Address: Phone Number:…… Fax Number…… Contact Person ……

Disposal of BMW

Category	Type of bag/container	Type of waste	Treatment disposal options
Yellow	Non chlorinated colour coded bags in coloured bins Separate collection system leading to ETP	• Human anatomical waste • Animal anatomical waste • Soiled waste • Expired or discarded medicines • Chemical waste • Micro, biotech & clinical lab waste • Chemical liquid waste	Incineration/deep burial
Red	Non chlorinated plastic bags in coloured bins/ containers	Contaminated waste (recyclable) tubing, bottles, urine bags, syringes (without needles) and gloves	Auto/micro/hydro and then sent to recycling
White	Translucent, puncture, leak & tamper proof	Waste sharps including metals	Auto/dry heat sterilization followed by shredding /mutilation/encapsulation
Blue	Water proof card board boxes/containers	Glassware waste	Disinfection or auto/micro /hydro then sent to recycling

*Disposal by deep burial is permitted only in rural or remote areas where there is no access to common bio-medical waste treatment facility. This will be carried out with prior approval from the prescribed authority

Conclusion

- Cleaning and disinfecting environmental surfaces is fundamental in reducing healthcare-associated infections
- Established cleaning strategies to be used
- Cleaning staff must be protected by use of standard precautions including use of appropriate PPE
- Prevent environment contamination by containing respiratory secretions
- Manage biomedical waste as per existing Biomedical waste management Rules

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Thank you