



# HOSPITAL INFECTIONS



by,

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- *Nosocomial comes from the Greek word nosokomeion.*
- *nosos = disease,*
- *komeo = to take care of.*
- *This type of infection is also known as a **hospital-acquired infection (or more generically healthcare-associated infections).***

# NOSOCOMIAL INFECTIONS ON PUBLIC HEALTH

Nosocomial infections are widespread. They are important contributors to morbidity and mortality. They will become even more important as a public health problem with increasing economic and human impact.



# CROWDING A MAJOR FACTOR

Increasing numbers and **crowding of people.**  
**More frequent impaired immunity (age, illness, treatments). New microorganisms.**

Increasing bacterial resistance to antibiotics contributed as emerging problem



- ***WHEN THE NOSOCOMIAL INFECTIONS MANIFEST***
  - Majority of such infections become evident during their stay in the Hospital or some times only after their discharge from the patient.

## HOW AND WHEN HOSPITAL ACQUIRED INFECTIONS OCCUR.

- **Nosocomial infections are infections which are a result of treatment in a hospital or a healthcare service unit, but secondary to the patient's original condition. Infections are considered Nosocomial if they first appear 48 hours or more after hospital admission or within 30 days after discharge.**

## PATHOPHYSIOLOGY

- Within hours of admission, colonies of hospital strains of bacteria develop in the patient's skin, respiratory tract, and genitourinary tract. Risks factors for the invasion of colonizing pathogens can be categorized into 3 areas: iatrogenic, organizational, and patient-related

# IATROGENIC RISK

- Iatrogenic risk factors include pathogens on the hands of medical personnel, invasive procedures (eg, incubation and extended ventilation, indwelling vascular lines, urine catheterization), and antibiotic use and prophylaxis.



# ORGANIZATIONAL

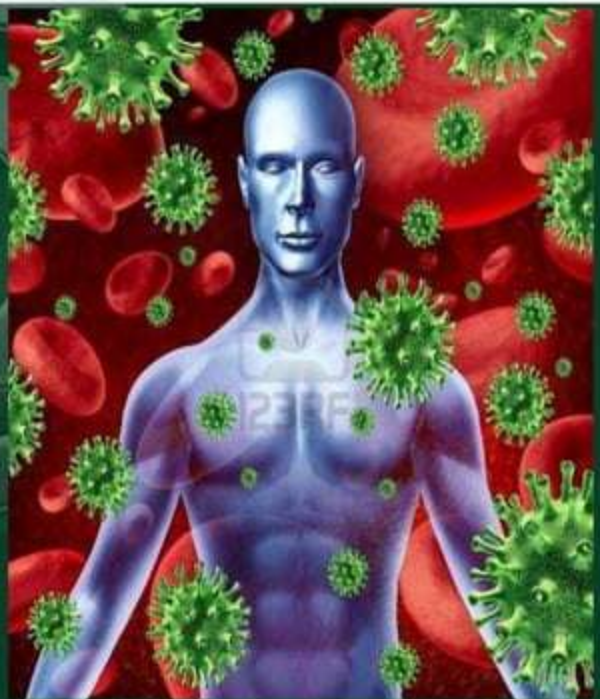
- Organizational risk factors include contaminated air-conditioning systems, contaminated water systems, and staffing and physical layout of the facility (eg, nurse-to-patient ratio, open beds close together).

# PATIENT ASSOCIATED

- Patient risk factors include the severity of illness, underlying immunocompromised state, and length of stay.
- **Prolonged stay in the hospital is a Major contributing factor**

# ROUTES OF TRANSMISSION OF INFECTION

- A susceptible host and appropriate inoculum of infecting microorganism with an appropriate route of transmission contributed in majority of cases



# AIR – BORNE ROUTE

- From respiratory tract via talking, coughing, sneezing
- □ From the skin by natural shedding of the skin scales during wound dressing or bed making.
- □ From aerosols from equipment, respiratory apparatus, air-conditioning plants.



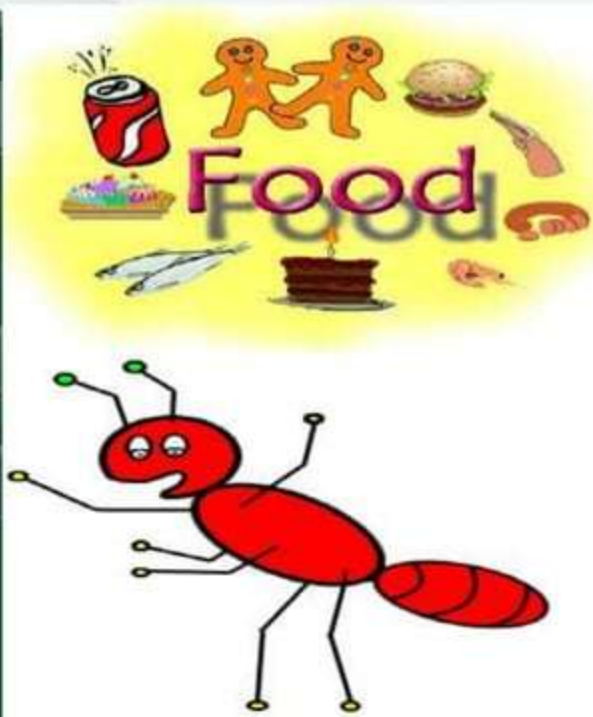
# CONTACT SPREAD

- ❑ In direct contact spread from person to person
- ❑ By indirect contact spread via contaminated hands or equipment.
- ❑ Clothing of staff,
- ❑ Urinary catheters, contaminated with hands of the operator may introduce organisms, or patients own flora from urethra may contribute to infection.



# FOOD BORNE SPREAD

- From hospital kitchen, or in special diets, infant feeds, kitchen, or commercial supplies
- □ Mechanical vectors flies, cockroaches or insects, or rodents act as carriers of infection.



# BLOOD BORNE SPREAD

- ❑ The accidental transmission of infections as HIV, HBV, and HCV by needle stick injuries is documented
- ❑ Syphilis and malaria a concern in high prevalence areas



## OTHER CONTRIBUTING FACTORS

Surgeons punctured surgical gloves, or moistened gown, imperfectly sterilized surgical instruments, or by airborne theatre dust. Faulty wound dressings may cause infections.



# OTHER SOURCE OF HOSPITAL INFECTIONS

- Hospital environment, includes defective constructions,
- □ People their behavior has great impact. Objects, food, water, Air in the hospital too contribute to infections.

# CROSS INFECTION

- Many different bacteria, viruses, fungi and parasites may cause Nosocomial infections. Infections may be caused by micro organism acquired from another person in the hospital (cross-infection) or may be caused by the patient's own flora (endogenous infection).

# USED/CONTAMINATED SYRINGES A GREAT THREAT IN DEVELOPING WORLD

- Some organisms may be acquired from an inanimate object or substances recently contaminated from another human source (environmental infection).



## COMMON SITES ASSOCIATED WITH ETIOLOGICAL AGENTS

- ***Urinary tract***
- ***Surgical wounds***
- ***Respiratory tract***
- ***Skin (especially burns)***
- ***Blood (bacteraemia)***
- ***Gastrointestinal tract***
- ***Central nervous system***

# PREVENTION AND CONTROL

- The basic responsibility of any good hospital remain with establishment of good infection control policies, which can always be achieved with
  - 1 An infection control committee
  - 2 An Infection team

# INFECTION CONTROL COMMITTEE

- Should meet regularly to formulate and update policies for the whole hospital on all matter which have bearing on infection control and to manage outbreaks of Nosocomial infection



# INFECTION CONTROL TEAM

- Which will function under the guidance of Infection control Doctor.
- A Medically qualified **Microbiologist, who will take responsibility of day to day for the policies formulated**



# THE FUNCTIONS OF THE COMMITTEE

- To do surveillance and infection monitoring of hygiene practices.
- Educate the Medical and Paramedical staff on policies relating to prevention of infection, and safe procedures



# INFECTION CONTROL NURSE

- Is the key member of the team
- Maintain the close working relations between Microbiology Laboratory, different clinical services and supportive services like laundry, pharmacy and engineering



# DECONTAMINATION AND STERILIZATION

- Fundamental importance lies with supply of sterile instruments, dressings and fluids.
- A availability of single use syringes, needles, catheters and drainage bags to be assured and planned for the regular supplies .

# ASEPTIC TECHNIQUES

- A no touch technique when dealing with sterile equipment coupled with strict personal hygiene.
- A strict rules laid when dealing the patients in the operation theatre and other procedures such as wound dressing and insertion of IV and urinary catheters.

# CLEANING AND DISINFECTION

- Basic cleaning, waste disposal, and laundry carry priority.
- The use of chemical disinfectants for wall floors, and furniture is warranted in special circumstances, such as spillages, of body fluids from patients with blood born viral infections

# SKIN DISINFECTION AND ANTISEPTICS

Hand washing is a most important procedure which should be practiced by health care worker, **gram – ve bacteria on the hands of the staff is an important factor in the spread of hospital infection.**

Alcohol based hand antiseptics gaining importance where washing with water and soap are not practicable.

Six stage handwashing technique



1. Palm to palm



2. Backs of hands



3. Interdigital spaces



4. Fingertips



5. Thumbs and wrists



6. Nails

# PROTECTIVE CLOTHING

- Different activities within the hospital require different degrees of protection to staff and patients
- Components of protective gear:
  - Gown
  - Apron
  - Face masks
  - Gloves
  - Headgear
  - Goggles
  - Boots

# ISOLATION

- **Source isolation is needed to prevent spread of specific infections to other patients**
- **Protective isolation is intended to protect susceptible or immunocompromized patients from infection**

## DISINFECTION POLICIES

- ❑ **All the hospitals should create disinfection policies which suit circumstances and economic resources.**
- ❑ **The procedures and products should have a limited range of options, and chemicals to be used only in desired circumstances.**
- ❑ **The policies should take into consideration surgical instruments, heat disinfection, Laundry, crockery and cleaning of floors and furniture.**



# PERSONNEL CARE OF HEALTH CARE WORKERS

- All health care workers should be screened for possible communicable diseases before employment, and offered immunization against **Hepatitis B Viral infection.**
- An education on **Universal Health Precautions** is highly essential

## THE FOLLOWING MEASURES WILL CERTAINLY CONTROL THE INFECTIONS

- **1 Sterilization**
- **2 Hand washing**
- **3 Closed drainage systems for urinary catheters.**
- **4 Intravenous catheter care**
- **5 Peri operative antibiotic prophylaxis for contaminated wounds, and care of equipment used in respiratory therapy.**

# SAVING THE COSTS IN PREVENTION IF INFECTIONS

- With raising economic costs in running safe hospitals eliminate the many **rituals or less effective practices** that they may even increase the incidence or **cost of cross infection.**



