Asepsis & infection control

A major concern for health partitions is the danger of spreading microorganisms from person to person and from place to place. **Microorganisms are naturally present in almost** all environments. Some are beneficial ;some are not. Some are harmless to most people, and others are harmful to many people. Still others are harmless except in certain circumstances.

Systematic approach to the control of infections include

- 1. Mass immunization programs
- 2. Laws concerning safe sewage disposal
- 3. Regulations for the control of communicable disease
- 4.Hospital infection-surveillance programs

Prevention of infection is a major focus for nurses.as primary caregivers, nurse are involved in

- 1. Identifying
- 2. Preventing
- 3. Controlling
- **4.** Teaching patient about infection control

Terminologies

- <u>Asepsis:</u> Is the absence of organism causing disease.
- <u>Medical asepsis(clean)</u>: Refers to practices which help reduce the number and hinder the transfer of disease-producing microorganism from one person or place to another.

- <u>Surgical asepsis (sterile)</u>: Practices that render and keep objects and areas free from organisms.
- <u>Microorganism</u>: A tiny living animal or plant that can cause disease ,most are visible only with a microscope.
- <u>Pathogen</u>: A microorganism that causes disease.

- <u>Contamination</u> :Means to make something unclean, such as area equipment ,if it contain microorganisms that cause disease.
- <u>Disinfectant</u> : A substance used to destroy pathogens but not necessarily their spores, in general not intended for use on persons.

- <u>Antiseptic</u> : A substance used to destroy pathogens on living object such as skin and mucous membrane .
- <u>Disinfection</u> : A process by which pathogens, but not spores, are destroyed.
- <u>Infection</u> :The invasion of the body by diseaseproducing microorganism and the body's reaction to their presence .

- <u>Cross –infection</u> :Is an infection transmitted from an infected person or an object to other persons or objects.
- <u>Inflammation</u> :is a response of a tissue to injury, often injury caused by invading pathogens. It is characterized by.
- •
- **Dincreased blood flow to the tissue causing**
- increased temperature,

- **redness**,
- swelling, and
- pain.
- <u>Sterilization</u>:
- A process by which all microorganisms including spores are destroyed.

Nosocomial infection

 also known as a hospital-acquired infection or HAI, is an infection whose development is favored by a hospital environment, such as one acquired by a patient during a hospital visit.

Isolation technique

- refers to the precautions that are taken in the hospital to prevent the spread of an infectious agent from an infected or colonized patient to susceptible persons.
- <u>Endemic</u> :The occurrence of certain diseases as they relate to a population or geographic area.

Chain of infection

• If any part of the chain is broken, the spread of the disease or infection will stop

- An infectious agent or pathogen
- A reservoir or source for pathogen growth
- A port of exit from the reservoir
- A mode of transmission
- A port of entry to a host
- A susceptible host



Infectious agent Causative agent

- 1. Bacteria
- 2. Viruses
- 3. Fungi
- 4.Protozoans single celled found in soil (most do not cause disease)
- 5.Parasites cause disease

Bacteria

- The most significant and most commonly observed infection-causing agents in health care institutions
- Can be categorized according to :
- 1. Shape
- -spherical (cocci)
- -rod shaped (bacilli)
- -corkscrew shaped (spirochetes)

- 2. Reaction to Gram stain
- Gram positive bacteria
- -Gram negative bacteria
- 3. Bacterial is their need for oxygen
- -aerobic :require O2 to live and grow
- -anaerobic : can live without O2

<u>2. Virus</u>

- Is the smallest of all microorganisms, visible only with an electronic microscope ,such as virus cause common cold and AIDS (acquired immune deficiency syndrome)
 - 3. Fungi
- Plant-like organism (molds and yeasts) that also can cause infection ,are present in the air ,soil, and water .
- Example of disease cause by fungi include athlete's foot ,ringworm, and yeast infections.

An organism's potential to produce disease in a person <u>depends on verity of factors, including:</u>

- 1. Number of organism
- 2. Virulence of the organism , or its ability to cause disease.
- 3. Competence of the person's immune system

4. Length and intimacy of the contact between the person and the microorganism.

Under normal conditions, some organisms may not produce disease .

Microorganism that commonly inhabit various body sites and are part of the body's natural defense system are referred to as normal flora .

Other factors may intervene causing this usually harmless organism to generate an infection .

For example .one type of Escherichia coli normally resides in the intestinal tract and causes no harm. However, if it migrates to the urinary tract, it can lead to UTI

Six parts of chain of infection:

- Reservoir resident, health care worker, environment, equipment
- Portal of exit excretions, wound drainage, urine, feces, blood, saliva
- Method of transmission airborne, droplet, contact, food/water, animals or insects
- Portal of entry non-intact skin, mucus membranes, respiratory tract, urinary tract, reproductive tract
- Susceptible host resident, health care worker, families, visitors

Stages of infection

An infection progresses through the following phases:

1. incubation period – the interval between the invasion of the body by the pathogen & the appearance of S/S

2. prodromal stage- most infectious – early S/S of the disease but are vague and nonspecific

3. full stage of illness– the presence of specific S/S

4. convalescent period–النقاهه-recovery for the infection S/S disappear

4 lines of defense against infection

- 1.Body's normal flora
- 2. Skin
- 3.Mucus membranes
- 4.Immune system immunity & vaccines

-Hepatitis B immunizations very important for (HCP)Health care providers

<u>2-Inflammatory response :</u>

□ The inflammatory response is a productive mechanism that eliminates the invading pathogen and allows for tissue repair to occur.

 \Box The inflammatory response also occurs in response to injury .it is either an acute or chronic process.

The **vascular and cellular stages** are the main component of the inflammatory process and these physiological processes are responsible for the appearance of the cardinal signs(redness , heat, swelling, pain, and loss of function).



Cellular stage

White blood cells(leukocytes) **Neutrophils (phagocytes)** Engulf the organism and consume cell debris Exudate (fluid, cell), Clear (serous), Red blood cell (sanguinous), Pus (purulent) Regeneration Scar SSUE

■ <u>3. Immune response</u> :

The foreign material is called an antigen ,and the body responds to the antigen by producing an antibody .(humoral immunity)

<u>Cell mediated defense (cellular immunity) :</u>

Increase the number of lymphocytes (white blood cell)

Help to defend the body specifically against bacterial, viral, and fungal infections, as well as malignant cell.

Why is infection control important? :

- Because it's vital to patients well-being and ours.
- Infection can lengthen a patient's stay.
- Infection Increase hospital costs, cause inconvenience, pain, even death.

Function of infection control :

- Preventing infection
- Detecting the outbreak of infection quality
- Establish right measures and proper action once infection discovered.
- Serves to promote patient care by reducing infection to the lowest level.
- Help to protect (patient, hospital personal, visitors).

The nurse in charge of a ward is responsible for

- 1- Maintain hygiene, consisted with hospital polices and good nursing practice on the ward.
- 2 Monitoring aseptic technique including hand washing and use of isolation.
- 3 Reporting promptly to the attending physician any evidence of infection in patients under the nurse care.
- 4 Initiating patient isolation and ordering culture specimens from any patient showing signs of a communicable disease when the physician is not immediately available.
- 5 Limiting patient exposure to infection s from visitors, hospital, staff, other patient, or equipment used for diagnosis or treatment.
- 6 Maintaining a safe and adequate supply of ward equipment, drug and patient care supplies.

Efficacy of the disinfecting or sterilizing method is influenced by the following factors.

- 1 Concentration of solution and duration of contact.
- 2- Type and number of pathogen.
- 3 Surface areas to treat.
- 4 Temperature of the environment.
- 5 Presence of soap.
- 6 Presence of organic materials.

• <u>Hand washing</u> is the most important and the most basic technique in preventing and controlling transmission of infection.