HYGIENE
OF HEALTH CARE FACILITIES

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Why is Hospital Hygiene (HH) important?

1. Statistics show, that a hospital is one of the most hazardous places to work → risk for staff

2. In USA roughly 5,200 deaths a year from AEMT and 108,000 deaths in which an AEMT was contributory, in 2019 occur (AEMT- Adverse effects of medical treatment) → risk for patients

AIM of HH

Protect health of the patients and the employees

Problems of health facilities
• one of the major environmental health problems
Directives, Laws
Legislation
Approximated to European legislation
355/2007 Law about Public Health Promotion and Protection,
553/2007 Directive about requirements and functioning in health facilities

Inhabitants (medical staff, patients and visitors)

Environment (inpatient, outpatient) occupational household community

Interactions, Relations
Roles of Hospital Hygienist

1. **Monitoring** – HH monitors the status of NI, infections and ATB resistance, HH maps NI according wards and patient status, epidemic requirements

2. **Decision-making** – HH determines and consults together with physician health status of patient with NI - isolation, in the ward or in infectious department, discharging home.
Roles of Hospital Hygienist

3. **Preventive – control** – HH regularly (once in 3 months) makes microbiologic monitoring of sterility and cleanliness of the environment (surface swaps).

4. **Protective** – HH protects health of patients and health personnel, recommends and controls preventive requirements

5. **Education** – HH educates health personnel in prevention and NI control, refers about the status of NI in the hospital environment
Problems of risk factors in health facilities include six areas:

1. Problems of the **infectious diseases (NI)**
2. Effects of ionizing and other types of the **radiation**- low doses, long time
3. Unfavourable effect of **chemical substances, chemical materials**- formaldehyde, ethylene oxide, cytostatics, anesthetic gases
4. **Psychosocial problems** (psychology of work, drug addictions etc.), emotional stress, psychosomatic disorders, shift work- fatigue, decreases motoric responses
5. Issue of **occupational physiology**; occupational physical load, standing, lifting a heavy objects
Workers in hospitals encounter unique risks that are uncommon in other industries

In particular:

• Hospital workers lift, reposition, and transfer patients who have limited mobility. Larger patients can pose particular challenges for safe handling.

• Workers may be near potentially contagious patients and sharp devices contaminated with bloodborne pathogens.

• Hospitals serve patients with physical or mental health challenges, some of which increase the likelihood of violent outbursts.

• Caregivers feel an ethical duty to “do no harm” to patients and often feel compelled to put patient safety above all else. Indeed, some will put their own safety and health at risk to help a patient.

• Work in hospitals is dynamic and unpredictable. A worker must be prepared to respond or react to various situations with split-second decisions.

• In addition to the special challenges of healthcare workers, hospitals face the diverse safety challenges associated with food services, materials handling, maintenance, cleaning, office work, and various other functions.
Risk factors in health care facilities

1. Physical
   - radioisotops
   - RTG diagnostic
   - laser therapy

2. Chemical
   - cytostatic drugs
   - narkotic gas
   - desinfectians
   - antiseptic substances

3. Biological
   - bacteria
   - viruses
   - moulds, fungi, yeasts, insects

4. Psychosocial
   - toxicomanies
   - iatrogenic diseases
Nosocomial infections (HI)
Health care – associated infections (HAI)
Hospital Acquired Infections (HAIs)

Healthcare-Associated Infections (HAI), i.e. all infections associated with patient care, in particular hospitals and long-term care facilities. These infections can occur during healthcare delivery for other diseases and even after the discharge of the patients

• an important cause of morbidity and mortality in hospitals in both developed and developing worlds

• same amount of victims as traffic accidents

• for the treatment-more than 4.5 billions Euros in Europe/year
Nosocomial infections

HAI leads to:

- **increased resistance** of microorganisms to antimicrobials
- serious **illnesses**
- **prolonged** hospital stays
- tragic **loss of life**
- additional **financial burden** to patients and healthcare systems

- The global burden is largely **unknown** due to the difficulty of reliable data acquisition based on uniform criteria for the diagnosis and surveillance for HAI.

- These infections occur worldwide both in **developed and developing countries**. Nosocomial infections accounts for **7%** in developed and **10%** in developing countries.

Nosocomial infections

- widespread of ATB, selection of drug-resistant microorganisms
- the use of **invasive techniques** for diagnosis and therapy (indwelling urinary catheter, intravascular lines, drainage tubes, shunts)
- many hospitalized patients (tertiary care hospitals) are **compromised** (deficiencies in immunologic responses or impaired host defenses - skin ulcers, aspiration tendencies)
- the very young and the elderly are particularly **susceptible to infection**
**ORIGIN AND SPREAD OF THE INFECTION**

- **Agens**
  - * markers of nosocomial species

- **Source**
  - * patient
  - * healthy personnel
  - * visitor
  - * other person
  - * animal

- **Way of transfer**
  - **Non specific vehiculum**
    - * air
    - * water
    - * food
    - * linen
    - * surfaces and objects
    - * wastes
    - * insects
  - **Specific vehiculum**
    - * surgical wound
    - * solutions (infusions, syringes, disinfection, treating)
    - * catheters (venous, urinary..)
    - * apparatuses (artificial ventilation, haemodyalisis...)
    - * endoscopies
      - stomatologic instruments
      - tonometers
    - * strange bodies (joints, lenses, nails...)
    - * instrumentarium
    - * binding

- **Patient**
  - * clinical prevention NI
The chain of infection

Susceptible Hosts
- Clients
- Service providers
- Ancillary Staff
- Community members

Reservoirs
- People
- Water and solutions
- Instruments and other items
- Equipment
- Soil and air

Places of entry
- Broken skin
- Puncture wound
- Surgical site
- Mucous membranes

- Infectious Agents
- Microorganisms such as: Bacteria, Viruses, Fungi

Places of exit
- Respiratory, genitourinary, and vascular systems
- Gastrointestinal tract
- Skin
- Mucous membranes

Modes of transmission
- Contact
- Droplet
- Vehicle
- Airborne
Prevention of nosocomial infections

1. Non specific measures

2. Specific measures
Prevention of nosocomial infections

1. Non specific measures/possibilities

Building and architectural
- Ventilation and air conditioning
- Epidemiological and decontamination sanitary

Ventilation
- Distribution of indoor air
- Air conditioning
- Laminar air-conditioning

Isolation of persons and patients
- Control of the hygienic regimen
- Control of bacterial colonisation of hospital environment
- Searching for sources of infection
- Education

Mechanical cleaning
- Disinfection
- Sterilization
  - Physical
  - Chemical
  - UV radiation
  - γ radiation
2. Specific measures

Immunisation

planned

active passive

non planned

passive
60% of HEI transmitted to patients by hands of personnel.

Hand hygiene is generally considered to be the most important measure to prevent the spread of HAI.
When to wash hands?

1. Before touching a patient
2. Before clean/aseptic procedure
3. After body fluid exposure risk
4. After touching a patient
5. After touching patient surroundings

How?
Handwashing steps using WHO technique

https://www.youtube.com/watch?v=lisgnbMfKvl
The Principles of Preventive Measures against 
Nosocomial Infections and Protection of Health 
in the Hospitals
OBJECTIVE ANALYSIS OF THE HYGIENIC LEVEL IN THE HOSPITAL WARD IN THE PREVENTION OF NOSOCOMIAL INFECTIONS AND HEALTH PROTECTION

1. Name and address of the hospital ward
2. Admission to the hospital
3. Hygienic regimen of employees
4. Personal hygiene of employees
5. Personal hygiene of patients
6. Manipulation with the biologic material
7. Hospital linen management
8. Problems of patients food serving/catering
9. Sanitation, disinfection methods of rooms and objects
10. Sterilization
11. Hospital waste management
12. Visits
13. Smoking, reserved rooms
14. Documentation of nosocomial infections, reporting and registering
1. Admission to the hospital

• the consistent case history (epidemiologic, travel) at admission to the hospital (reception, central reception)
• looking for a possible infection, for contact of patients with infectious disease in the family, at the workplace
• to make patients acquainted with the ward regimen/familirization
• to put a patient into room according to relevance of illness

• preparation of the bed for a patient (disinfection by 2 % Chloramine solution, clean bedside table, bedclothes, linen, pyjamas)
• the sanitary filter of a patient (taking a shower, disinsection)
• possibility to put the civil clothes into hospital wardrobe-cloakroom
• performing the basic laboratory tests according to current health status of a patient (tonsile and rectal tampona)
2. Hygienic regimen of the employees

• to use the protective **mask, shield, glasses**

• to use the disposable/protective **gloves** (taking the material to laboratory tests, morning, evening hygiene, cleaning of the floor, working with bedclothes - counting of the used bedclothes)

• to report the each **personal infectious** disease to the chief of the department and to the GP or personal physician

• to report the each **injury** or accident occurred at the workplace (needle-pick)

• in the case of hepatitis type B suspicion
  - vaccination of the other members of a collective
  - to report on PHI (Public Health Institute)
  - isolation
  - focus disinfection
  - looking for a source of infection
2. Hygienic regimen of the employees

- **Hand washing** before/after each patient examination
- Hand washing after each exposure to contaminating agent
- Protective **clothes** according category of workers
- Civil and working **clothes stored separately**
- **Sufficient amount** of protective clothes
- Washing of protective clothes in the **institutional laundry** (not at home)
- Possibility to take **shower** before and after working shift
3. Hospital linen management

- **sufficient number** of bedlinen (bedclothes, towels, pyjamas)

- **clean linen** should be put in a clean section of a linen room or container, necessary to disinfect them weekly by the 1% Chloramine solution

- changing of bedclothes and personal clothes of patients **according to needs**, weekly, immediately after contamination

- putting the **dirty linen** into a cleaning room in tied up bags or in a metal bucket, or other container

- sorting of dirty linen according to the kind of contamination

- **separating** the hospital linen from personal linen of the staff

- the covering of linen should be waterproof and suitable for washing

- sorting and counting of the dirty linen in the **separate room** for dispatch to the laundry
• **daily transport** of the dirty and contaminated linen to the laundry

• daily transport of a clean linen from laundry to the clean laundry bags

• **disinfection** of transport trolleys daily with the 2% solution of Chloramine

• daily disinfection of cleaning room (walls, floor) by the 2% solution of Chloramine

• manipulation ancillary staff uses personal **protective** clothes, gloves, mask

• it is necessary to handle carefully with contaminated linen, not to shake it, to give it into bags, to use a protective mask, gloves, cloak

• disinfection of beds in the „**central bed preparation/central adjustment** of beds department“
4. Manipulation with biologic material

- manipulation as with the infectious material
- special room for taking the biological material
- to use disposable gloves in taking of biological material
- to take care the biologic material not to be broken or impaired
- a quick transportation to the laboratory
- a place contaminated with biologic material should be disinfected by 3% Chloramine solution; when something is broken it is necessary to cover the place with a cotton wool soaked in 3% Chloramine; let it 10 minutes react, then the plate should be disinfected again by 2% Chloramine solution
5. Sanitation/cleaning and disinfection/germicide of rooms, objects

- disinfection **timetable** in the ward
- before each disinfection of the instruments, apparatuses, floor; **mechanical cleaning** is needed (Record or other detergent), then disinfection according to the law of Ministry of Health
- daily disinfection of the whole hospital ward (rooms, closets, examination room, canteen, little kitchen, corridor) with 2% Chloramine solution, disinfection and maintenance of the manipulation **trolleys, stools, armchairs, wheelchairs** daily
- sufficient and regular **ventilation**
- disinfection **of thermometers** before and after each application (daily exchange of disinfective solution) 1% Chloramine
6. Sterilization

• autoclave, sterilisator

• sterilization of all implements needed, bandages, dressings

• central sterilization, ward sterilization

• to make a note/record of each sterilization

• to use the disposable material
7. Personal hygiene of patients

- **morning** and **evening toilet/have a wash, take a shower**
- **change** of the bedclothes according to contamination, change of the linen
- efficient **nursing**, barrier nursing
- **positioning** of a patient, prevention of decubitus
- efficient room and ward **ventilation**
- daily **disinfection** of patients’ devices (bedpans, urine bottles); by 2% Chloramine after each use
- necessity of improved sanitation before some investigations (Echocardiogram (ECHO), Electrocardiogram (ECG), Angiography)
- **not to use** cosmetics, hair sprays, nail-vanish
8. Hygienic principles at visits

• to keep the time for visits (daily from 3 p.m. to 5 p.m.)
• the immobile patients receive the visitors in a ward
• the mobile patients receive visitors in a hall (vestibule)
• visitors shouldn`t be noisy, they have not to bring food for patients
• visitors shouldn`t sit on bed and put their clothes on patient`s bed
• after finishing the visits to put the patient`s rooms in order, ventilate the rooms, to control the food (especially diabetics)
9. Problem of patients` catering/boarding, manipulation and management

• the food is taken to hospital in thermos cans (in the older hospitals) or in culinaries (tray system)

• the food must be fresh prepared, adequately warm, separated according to diets

• cutleries are individualized

• the food is served in the canteen (designated place), for immobile patients the food is served in the room

• cutlery and glasses are disininfected after the each meal
10. Hospital waste management

- separation, collection, storage, handling of the waste

  • sorting the waste according to **various kinds** into litterbins/separated places for waste disposal

  • paper cartons (boxes) for infusion sets, syringes, needles, glass

  • plastic bags for litter from the ward have to be binded up after filling biological and infected material: separately in marked plastic bags

  • **transport** two times daily

  • **disinfection** of the litterbins weekly by the 2% solution of Chloramine,

  • daily exchange of bags, if there are no bags, it is necessary to disinfect the litterbins
Categories of health care waste

**Non-risk health care waste** – same kinds of materials as urban domestic waste

**Risk (hazardous) health care waste**

“Sharp waste”; syringe, needles, scalpels, other sharp medical instruments and contaminated broken glass

**Infectious waste** - blood and blood products, items contaminated with blood, serum or plasma, cultures and stocks of infectious agents from diagnostic and research laboratories, wastes from highly infectious patients

**Anatomical waste** - human tissues, biopsies and autopsies

**Chemical waste** - solvents, reagents, film developers, mercury from old thermometers, batteries

**Pharmaceutical waste**

**Radioactive waste**

**Pressurized containers** - cylinders containing gases or aerosols, when accidentally punctured or incinerated could explode.