

Hand washing in disease prevention



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Introduction

The most frequent way of germ spreading is by people's hands. Most of the times germs are harmless but sometimes they can also be reason for illnesses like flu, cold and gastroenteritis.

Washing your hands thoroughly with soap and warm water is one of most important thing you can do to avoid spreading infections and it helps to protect you, your family members and people around you.

Specially every health-care worker or a person who concerned in direct or indirect patient care must be care about hand hygiene and must be able to perform it properly and at the correct time. It helps to prevent health care-associated infections [2].

“ CDC (Centers for Disease Control and Prevention)” has estimated that every year almost 2, 000, 000 patients in the USA get an infection in hospitals, and about 90, 000 of these patients die as a result of their infection [1].

History of hand washing

Hand washing with soap and water has been used as a measure of personal hygiene for a long time and has been generally implanted in religious and civilizing practices. However the relationship between hand washing and the spread of disease was confirmed only near 200 years ago.

Ignaz Semmelweis established that hospital-acquired diseases (HAD) been transmitted through the hands of health care workers by his studies in

Austria, Vienna and Oliver Wendell Holmes in Boston & USA. In 1847, he was appointed as a house officer in an obstetric clinic at the University of Vienna Allgemeine Krankenhaus. He observed that maternal mortality rates, commonly reasonable to puerperal fever, were considerably higher in mentioned clinic compared with the other .

He also identified that doctor as well as medical students usually went straight to the delivery suite after doing autopsies and had an unpleasant odor on their hands regardless of hand washing with soap and water earlier to entering the clinic. He introduced that “ cadaverous particles” from the autopsy room, that transmitted through the hands of students and doctors to the delivery theatre caused the fever. As a result, Semmelweis suggested that hands be cleansed by a chlorinated lime solution before examine each patient and also after leaving the autopsy room. Following the administration of this measure, the mortality rate fell affectedly to 3% in the clinic remained low.

Apart from providing the 1st evidence that cleansing thoroughly contaminated hands with an antiseptic agent can decrease nosocomial transmission of germs more significantly than washing hands with plain soap and water, this method includes all the essential elements for successful contamination control interference: “ recognize-explain-act”. Both Holmes and Semmelweis failed to examine a sustainable change in the behavior change of their colleagues’ behavior. In particular, Semmelweis experienced great difficulties in persuading his colleagues and directors of the benefits of this method. In the light of the ethics of social marketing in the present day, his key mistake was that he introduced a system change (administration of <https://assignbuster.com/hand-washing-in-disease-prevention/>

the chlorinated lime solution) without explaining the attitudes of his collaborators. In spite of these mistakes, the Semmelweis intervention has taught us many lessons; the “recognize-explain-act” approach has driven many investigators. Semmelweis’s intervention is also a type of epidemiologically obsessed strategies to avoid infection.

In the 1980s concepts of hand hygiene in health care have been changed. The 1st national hand hygiene guidelines were in print in the 1980s. “The Healthcare Infection Control Practices Advisory Committee (HICPAC) in the USA” suggested that whichever antimicrobial soap or an antiseptic agent be used for cleaning hands while leaving the rooms of patients with drug-resistant pathogens in 1996. In recent past the HICPAC guidelines issued alcohol-based hand rubbing.[3]

With the time methods of hand washing and chemicals that use are changing with research inventions.

Normal bacterial flora of the body

- (1) Axilla, perineum and between the toes
- (2) Hand, face and trunk
- (3) Upper arms and legs.

Skin with partial occlusion like axilla, perineum and between the toes contains more microorganisms than less occluded areas as legs, arms, and trunk

The numbers of bacteria on the skin of a person remain relatively constant; survival of the bacteria and the extent of colonization probably depend on

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part upon the contact of skin to a exact environment and partly due to the innate and species-specific bactericidal activity in skin. Most of the microorganisms live in the superficial layers of the stratum, corneum and the upper parts of the hair follicle. Some bacteria are located in the deeper areas of the hair follicles and are away from the reach of normal disinfection procedures. These bacteria are reservoirs for settlement after the surface of bacteria were removed.

Staphylococcus epidermidis

S. epidermidis is an important microorganism that lives on the skin, and in some areas it makes more than 90% of the resident aerobic flora.

Staphylococcus aureus

The nasal area and perineum are the most familiar sites for *S. aureus* colonization. *S. aureus* is common to the vulva. *S. aureus* is very often (80% - 100%) to the skin of patients with certain dermatological diseases such as atopic dermatitis.

Gram-negative bacteria

They occupy small portion of the skin flora.

Micrococci

Micrococci are not as frequent as staphylococci and diphtheroids; on the other hand, they are often present in normal skin. *Micrococcus luteus* , is the predominant species.

Diphtheroids

The term refers to diphtheroid, a variety of bacteria belonging to the genus *Corynebacterium* common in the armpit and on open skin.

They like to be involved in the pathogenesis of acne.

Streptococci

β -hemolytic streptococci, are infrequently seen on normal skin. α -hemolytic streptococci, exist primarily in the mouth little spread on the skin.

Nail Flora

Dust particles and other foreign matter can accumulate under the nail. They can carry fungi and bacilli, such as *Aspergillus*, *Penicillium*, *Cladosporium* and *Mucor* wear.[4]

Transmission of pathogens by hand

There are two main routes of transmission of pathogens.

1. Airborne transmission
2. Contact transmission

Airborne transmission

They can be transmitted from the respiratory tract through talking coughing & sneezing, from the skin by natural cracking of skin scales, during wound dressing or bed making and by aerosols, also from equipment such as respiratory apparatus and air conditioning plants.

Contact transmission

The most frequent routes of transmission for infection are by direct contact spread from one to another or by indirect contact spread by unhygienic hands or equipment.

Staphylococcal & streptococcal sepsis, enterobacterial diarrhea & *Pseudomonas aeruginosa* sepsis are examples for diseases that can be arise due to contact transmission.

So hand washing is very important in preventing contact transmission of pathogens and so to avoid spreading diseases. [5]

Transmission of health care-associated (HCA) pathogens from one patient to another via health care workers' (HCWs) hands requires five sequential steps,

1. Micro-organisms to present on the patient's skin, or have been shed onto dead objects instantly surrounding the patient.
2. Micro-organisms should be transferred to the hands of HCWs.
3. Micro-organisms should be able to survive for at least few minutes on HCWs' hands.
4. Amount of hand washing or antiseptics of hand by the HCW should be insufficient or entirely omitted, or the substance used for hand hygiene unsuitable.
5. The unhygienic hand or hands of the caregiver must approach into direct contact with another patient or with an object that will come into direct contact with the patient.[3]

Steps of hand washing

Hands can cleanse with soap, alcohol, water etc.

Hand hygiene technique with alcohol-based formulation.

There are 8 steps & duration is nearly 20-30 seconds,

1st step – Apply a full palmed amount of the product in a cupped hand, to cover all surfaces.

2nd step – Rub hands palm to palm.

3rd step – Right palm over left dorsum with interlaced fingers and vice versa.

4th step – Palm to palm with fingers interlaced.

5th step – Backs of fingers to opposing palms with fingers interlocked.

6th step – Rotational rubbing of left thumb clasped in right palm and vice versa.

7th step – Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.

8th step – Dry.

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Hand Hygiene Technique with Soap and Water.

It takes 40-60 seconds & there are 10 steps,

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1st step- Wet hands with water; apply enough soap to cover all hand surfaces.

2nd step- Rub hands palm to palm.

3rd step- Right palm over left dorsum with interlaced fingers and vice versa.

4th step- Palm to palm with fingers interlaced.

5th step- Backs of fingers to opposing palms with fingers interlocked.

6th step- Rotational rubbing of left thumb clasped in right palm and vice versa.

7th step- Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.

8th step-Rinse hands with water.

9th step- Dry hands thoroughly with a single use towel.

10th step- Use towel to turn off faucet. [3]

Substances that used in hand washing

Soap and detergents

Reduce barriers to solution and increase solubility is the main action of soap and detergents. [6]

Water temperature

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Hot, soapy water is more successful than cold, soapy water on removing the natural oils on hands which grasp soils and bacteria. [6]

Antibacterial soap

Antibacterial soaps have been greatly promoted to a health-conscious community. No evidence for that using recommended antiseptics or disinfectants selects for antibiotic-resistant organisms in nature. Although, antibacterial soaps contain general antibacterial chemicals such as Triclosan, which has a wide list of resistant strains of micro-organisms. [6]

Solid soap

Because of its reusable character, may hold bacteria acquired from previous uses. However as the micro-organisms are rinsed off with the foam, it is implausible that any bacteria are transferred to users of the soap. [6]

Hand antiseptic

A hand sterilizer or hand antiseptic is a non-aqua-based hand hygiene mediator. Most of them are based on isopropyl alcohol or ethanol formulate which mixed with a thickening agent such as Carbomer , or humectant such as glycerin, or foam for easiness of use and to diminish the drying result of the alcohol. [6]

Alcohol-based hand sanitizers

They are almost entirely ineffective against Norwalk type viruses, the most general reason for contagious gastroenteritis.[6]

Ash or mud

This is also a disinfecting agent. WHO suggested ash or sand as option for soap when soap is not available. [6]

Importance of hand washing & when to wash hands

Importance of hand washing

Hand washing is like a vaccine that someone can do it yourself, which consist of five simple steps (Wet, Lather, Scrub, Rinse, Dry). Important to reduce the spread of diarrheal and respiratory illness therefore you can stay well.

Habitual hand washing, mainly before and after certain activities, is one of the best ways to remove microorganisms, keep away from illnesses, and to reduce the spread of germs [1].

When to wash hands in day today life

Always wash your hands before; cooking food or eating, taking or giving medicine, &Inserting or removing contact lenses. [8]

Also wash your hands after: preparing food, specially raw meat or poultry, changing a diaper or using the toilet, touching an animal or animal toy, leashes or waste, blowing your nose, coughing or sneezing into your hand, caring for a sick or injured person, handling trash, household or garden chemicals, or anything that could be contaminated like cleaning cloth or soiled shoes & shaking hands with others. [8]

When to wash hands for health care workers

Before performing invasive procedures like taking care of particularly susceptible patients such as those who are severely immunocompromised and newborns. [9]

Before and after touching wounds traumatic, surgical or related with an invasive device. [9]

After situations during which microbial contamination of hands is probable to occur, especially those involving contact with mucous membranes, blood or body fluids, and body secretions or excretions, touching dead sources that are likely to be contaminated with virulent or epidemiologically significant microorganisms; these sources contain urine-measuring devices or secretion collecting apparatuses, taking care of an infected patient or one who is likely to be colonized with microorganisms of special clinical or epidemiologic importance, for example multiple-resistant bacteria and between contacts with different patients in high-risk units.[9]

Diseases occur due to bad hand hygiene

Infections that may be transmitted through this route include hepatitis A, salmonellosis, shigellosis, giardiasis, enterovirus, campylobacteriosis and amebiasis. As these diseases are spread through the intake of even the little particles of fecal material, hand washing after using the toilet cannot be taken easily.

“Influenza, streptococcus, respiratory syncytial virus (RSV) and the common cold” are diseases spread through indirect contact. As these diseases can be spread indirectly by hands contaminated by respiratory discharges of

infected people, illness may be reduced by washing hands after coughing or sneezing and after shaking hands with someone who has been coughing and sneezing.

Microorganisms transmitted by one or more body substances such as urine, saliva or other moist body substance include cytomegalovirus, typhoid, staphylococcal organisms, and Epstein-Barr virus. These organisms may be transmitted from person to person or indirectly by contamination of food or inanimate objects such as toys. [10]

Alcohol rub sanitizers kill bacteria, multi-drug resistant bacteria (MRSA and VRE), tuberculosis, and some viruses like HIV, herpes, RSV, rhinovirus, vaccinia, and fungus and stop diseases. [9]

Thus, hexachlorophene and quaternary ammonium compounds are valuable for prophylaxis of staphylococcal infection but not of infection by *Pseudomonas pyocyanea*. [12]

Antibiotics such as neomycin and bacitracin, which are rarely administered systemically, may be applied as topical antiseptics. They should be used in combinations, or mixed with synthetic agents such as chlorhexidine, in order to minimize the risk of producing resistant strains. [12]

Recurrent furunculosis is usually the result of re infection from a carrier site on the patient's body. Many nurses become carriers of 'hospital' staphylococci, and the furunculosis which in some hospitals causes a good deal of minor ill-health, is often a consequence of cross-infection. [12]

World hand washing day

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Global hand washing day is October 15.

Global hand washing day is an annual global encouragement day devoted to expanding knowledge and understanding about the importance of hand washing with soap as a successful and inexpensive way to prevent diseases. It is an opening to design, test, and reproduce creative ways to encourage society to wash their hands with soap at important times.

The day was founded by the Global Public-Private Partnership for Hand washing. [7]

Disadvantages of hand washing

There are some disadvantages of hand washing, some products that used in hand washing can be affect to generate bad effects in hand washing.

Triclosan is an antibacterial agent which also has some antifungal and antiviral properties that contain in hand washing agents, researchers have found that it causes to change hormone balance in animals, also can lead to the development of antibiotic-resistant germs and can be harmful to the immune system.[11]

Sodiumlaureth Sulfate (SLS) and triclosan are two common ingredients contain in hand washes which are responsible for most cases of contact dermatitis.

The SLS is a foaming agent used in many personal care products. As well as hand washing products, it contains in shampoo, shower gel, toothpaste;

potentially in shortly whatever thing that foams. A small number of people are sensitive to SLS and may lead to skin dryness or contact dermatitis. [11]