

Vaccination

Vaccination is prevention for the childhood infectious diseases. Lately, there are no mortalities caused by infectious diseases, because of vaccination.

In developed countries (and Jordan) no one dies because of the measles, malaria or polio...etc; infectious diseases is not a cause of mortality anymore, but in the developing countries the rate of mortalities caused by infectious diseases is high because of standard of living, high malnutrition and vaccination is not really covered properly there, unlike the developed world where vaccination is universal and covered properly.

Prevention and control of Communicable Diseases

Communicable diseases are diseases that can be transmitted from a person to another through different routes of spreading (direct contact, droplet infection, sexual contact, mother fetus infection or oral-fecal.).

It is important to know about the infectious disease for vaccination:

- whether the disease is viral or bacterial:

as bacterial severity and general condition of the patient is worse, and for the management; in bacterial infections the first type of management is antibiotic where viral if we want to give antibiotics we prevent secondary infection if there is an immune problem but at viral we treat only the symptoms not the virus, usually it is a self-limiting disease.

- Whether it is a live-attenuated vaccine, a killed vaccine or toxoids (how safe it is) :

if the immunity is very good we give *live-attenuated*, but if it was poor or the general condition of the child was poor we do not, because he may get the infection. where if it was killed vaccine or toxoid it doesn't effect, we give them even for pregnant women or for who have any other immune deficiency problem. Talking about *killed vaccines* sometimes they have a direct effect on some organs in the body like whooping cough it has a direct affect on the brain, but toxoids they are always safe, they are antitoxins.

-The incubation period of the disease: which the period between the entry of the virus and the first symptoms appearance, in where the person is carrier and infectious. In order to tell how long the child has to be isolated.

- The complications of the disease because we want to know how serious is the disease and important is the vaccine. The more serious are the complications, the higher mortalities, the more important is the vaccine, the more we give the vaccine the priority to be in the national vaccination program. Eg: Malaria and cholera are given the priorities in developing world.

In Jordan measles is one of the important diseases that should be vaccinated, unlike developed world eg, England and USA.

The national vaccination program, (table of vaccinations) differs from one country to another, depending on:

- 1- The prevalence of diseases.
- 2- Severity of the diseases.
- 3- The general condition of the children.

Steps followed to accomplish control of communicable diseases:

1- Reporting: about the table in PHC which includes how urgently is it to report the cases, memorize the diseases we will talk about in this lecture.

2- Observing of the coming foreigners and tourist who are going to stay in the country for more than one month and testing them for certain disease e.g. AIDS, Malaria etc..

3-Sending teams in cases of outbreaks and epidemics.

Outbreaks at al zaatri they are giving the children poliomyelitis vaccine. Polio is transmitted Oral-fecal that's why water pollution is important in this disease. So they must observe the source of disease and source of transmission to do their job.

4-Coordination with other ministries (Ministry of agriculture and Brucellosis); some disease transfer form animals to humans.

5-Vaccination, to put the right national vaccination program according to the previous mentioned points.

For adults the main diseases are Non-communicable diseases but for childhood the main ones are the communicable disease. Because for children under 5 years, their immune system is developing.

How Some Childhood Infectious Diseases Are Spread? (Mood of transmission)

It is important to know how the disease is transmitted in order to prepare the proper prevention.

Direct Contact with infected person's skin or body fluid	Respiratory Transmission "droplet infection	Fecal-Oral Transmission (touching feces or objects contaminated with feces then touching your mouth),
•Chickenpox: through the rapture for the blisters.	•Chickenpox	•E. Coli
•Cold Sores, there is a certain sores produce secretion in where it's transmitted by touching if the hand	•Common Cold	•Enterovirus like rotaviruses.
•Conjunctivitis:	•Diphtheria	•Giardia
•Head Lice	•Bacterial meningitis	•Hepatitis A. Hepatitis B is transmitted by blood
•Ringworm touching of the hands	•Influenza	•Infectious Diarrhea
•Scabies : الجرب	•Measles	•Pinworms
	•Mumps	•Polio
	•Pertussis "whooping cough".	•Salmonella
	•Pneumonia	•Shigella (it is very rare nowadays).
	•Rubella	Measles

Keeping an immunization record is very important. Now in Jordan we have policy, none can enter school without immunization record to make sure that the immunization is covered during the first 5 years.

Immunity:

It is the defense mechanism of the body against the invasion of pathological microorganisms.

1 - General immunity

General defensive mechanisms available from birth. Eg: skin, mucosal barriers, tears, blood substances that inhibit motility or multiplication of organisms ...etc.

2- Specific Immunity

This type develops against specific microorganisms. It can be acquired in 2 ways:

a- Active immunity: acquired by coming in contact with the pathogen either by contracting the disease itself or by vaccination "attenuated"(like measles and mumps vaccines). Long acting period.

b- Passive immunity (like tetanus and diphtheria toxoids)

- Acquired by receiving antibodies from an actively immunized person or animal.
- It is quickly acquired
- Short lived in comparison to actively acquired immunity.
- Can be acquired in two ways:

*Natural: Antibodies passing from the nature or from mother to newborn via breastfeeding or placenta or through start falling during the first weeks and disappear within the first 6 months.

*Artificial: acquired by injection of specific or standard (non-specific gamma globulins).e.g. Specific immunoglobulins are available for hepatitis B, tetanus (toxoid), mumps..etc.

Importance of vaccination

- Diseases that are common, can kill or cause disability, can be prevented.

The main diseases are:

- Measles.
- Tuberculosis.
- Pertusis "whooping cough"
- Diphtheria.
- Poliomyelitis.
- Tetnus.

Rubella is not at the national program of vaccinations. Triple vaccine DPT diphtheria, pertusis and tetanus.

Note: the following tables include some differential points about the 5 infectious diseases, just to make it easier to remember these major points, but other info are present later in the sheet, each alone.

	Diphtheria	Tetanus
Bacterial/viral	Bacterial	Bacterial
Incubation period	2-7 days, 3 days in avg. (short)	Up to several months (long)
Symptoms	It might be very mild so some people might not feel anything or just look sick. Others might have: - sore throat – fever. - chills. - Difficulty swallowing. - Thick gray coating over the back of the throat.	- Stiff muscles in the jaw and neck with difficulty swallowing. - Difficulty opening mouth. - Muscle rigidity in the arms, legs, and stomach with painful convulsions.
complications	Within 6-10 days serious problems can occur: - Suffocation. - Paralysis; toxins hits nerve endings. - Heart failure (myocarditis) - coma. -death.	- Broken bones from muscle spasms. - Breathing problems/lung infections. - Coma and death.

	Pertussis	Poliomyelitis	Measles
Bacterial/viral	Bacterial	Viral	viral
Incubation period	5-10 days	1 week to 3 week, 6-20 days.	8-12 days
symptoms	Adults usually do not get very sick • children can have: - fever -coughing - severe cough with a "whooping" sound. - Vomiting and exhaustion after severe coughing -difficulty breathing	- fever - severe muscle pain or spasm - paralysis – headache - some people do not look or feel sick, but can still spread the disease to others	- High fever - Red eyes. -Swelling of the eyelids. - Runny nose. - Rash that begins (after 3-4 days) along the hairline and moves downward to the face, neck, body, hands, and feet. *The symptoms are clearer in light color skin.
complications	- Pneumonia. - Seizures. - Brain damage. - Death	- Long-term paralysis "worst one". - Inability to breathe without the help of a	- Pneumonia. - Ear infections. - Encephalitis: brain damage

		machine . – Death.	- seizures. –death.
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Diphtheria

- can cause serious illness.
- kills 1 of 10 people infected, with it 10% mortality rate; very serious.
- Lives in mouth, nose, and throat of an infected person, it is a droplet infection.
- If not treated, the child could die from suffocation because of the very thick grey coating membrane at the back of the throat, it is so pussy and smell very bad, they can't breathe.

• **Treatment:**

1-Antitoxin

It is the most important step and the first line of management, because I want to kill the toxins which reach the nerve endings.

2- Antibiotics.

• Isolation of patients:

Diphtheria patients must be isolated for one to seven days or until two successful cultures show negative swaps; that they are no longer contagious. Because it is very infections through droplets. Children placed in isolation are usually assigned a primary nurse for emotional support.

• Identification and treatment of contacts:

Because diphtheria is highly contagious and has a short incubation period, family members and other contacts of diphtheria patients must be watched for symptoms and tested to see if they are carriers. They are usually given antibiotics for seven days and a booster shot of diphtheria/tetanus toxoid.

• Reporting cases to public health authorities

some cases you have to report them on the spot, weekly or monthly aspect. The more serious the diseases the more urgent you have report it.

• Two pictures: 1- very swollen neck and it look toxic

2- the grayish membrane at the back of the throat, full of puss.

Tetanus

- It is transmitted through wounds but in newborn it is very serious because it is transmitted umbilical cord and it causes muscles paralysis, most important muscle paralysis are at Jaw (lock jaw) and chest muscles(they may die due to respiratory distress).
- The bacteria here are anaerobic bacteria.
- - Child has painful muscle spasms from tetanus, nearly impossible for her to move or control the muscles in her body.
 - Baby has tetanus cannot breast-feed or open his mouth because the muscles in his face have become so tight. He should be fed by nasogastric tube.
- Tetanus can cause serious illness and death.

- Tetanus bacteria:
 - lives in dirt and the intestines and feces of animals
 - enters the body through cuts, punctures, or other wounds.
- Baby has neonatal tetanus; baby is completely rigid.
 - Tetanus kills most babies who get it.
 - Infection can happen when newly cut umbilical cord is exposed to dirt.
- **Treatment :**
 - For mild cases:
 - Anti -toxins
 - tetanus immunoglobulin IV or IM
 - metronidazole IV for 10 days
 - diazepam; they give it as valium to treat muscular spasm.
 - For Severe cases:
 - Sometimes they need tracheotomy because the muscle might be very rigid they cannot respire, which cause respiration failure and respiration distress, accordingly they may need tracheotomy or mechanical ventilation.
 - Also magnesium, as an intravenous (IV) infusion, to prevent muscle spasm.
 - The three pictures for tetanus cases:
 - 1- severe child very toxic.
 - 2- Nasogastric tube.
 - 3- Child with jaw spasm.

Pertussis " whooping cough"

- It is highly contagious.
- Bacterial infections caused by Bordetella pertussis.
- In some countries it is called the 100 days' cough, because coughing stage lasts for 6 weeks sometimes or 3 months before subsiding, even if treated.
- Symptoms are initially mild, and then develop into severe coughing fits, which produce the namesake high-pitched "whoop" sound in infected babies and children when they inhale air after coughing.
- Prevention by vaccination. Antibiotics are needed because it is bacterial infections and usually the drug choice is erythromycin.
- It is a serious disease especially in newborn because in the respiratory system secretes very thick mucus that may cause suffocation for the patients, adults are protected by coughing, but in newborns, coughing reflex is very poor so however they will not be able to get the mucus out. And they need to be evacuated.
- Pertussis germ:
 - lives in the mouth, nose, and throat.
 - spreads through coughing and sneezing.
 - spreads very easily from parent to child or child to child.
- Children under 7 years of age need to be vaccinated against pertussis. Usually they are vaccinated above 5 years but after 7 because they stop it because it had a direct effect at the brain.

- Prevention by vaccination, sometimes the drug choice for pertussis is Prophylactic antibiotics for who have been exposed and are at high risk of severe disease as preventive measure.
- The duration of protection is between five to ten years, because it is a killed vaccine, this covers childhood, which is the time of greatest exposure and greatest risk of death from pertussis.

For children, the immunizations are commonly given in combination with immunization for tetanus and diphtheria.

- Management :

We have to do suction and make sure that the mucus is out and the drug choice (antibiotic) is erythromycin or azithromycin.

Poliomyelitis

- Transmitted via oral-fecal route.
- Although 90% of the infected patients show no symptoms at all, while 1% of the patients if they conglomered or they have immunity problems, viruses go into the nerve endings to cause a permanent damage paralysis. The virus enters the central nervous system, preferentially infecting and destroying motor neurons, leading to muscle weakness and acute flaccid paralysis.
- Virus particles are excreted in the feces for several weeks following initial infection. That is why carriers are too high, accordingly they give mass vaccination.
- The most infectious period: is 7 and 10 days before and after the appearance of symptoms.
- Factors that increase the risk of polio infection:
 - immunity problems.
 - Malnutrition; more important at developing countries.
- **Treatment:**
because it is a viral infection, the focus of modern treatment has been on providing relief of symptoms, speeding recovery and preventing complications.
- Prevention:
two types of vaccines:
 - 1- attenuated given orally.
 - 2- Killed given IM.

*Children are given only orally unless they have problems.

Measles

- The patients should be isolated after the first symptom appears.
- A person is mildly contagious when he or she first experiences symptoms, and is most contagious about four days before the onset of the measles rash. Some risk of measles transmission lasts until about four days after the rash starts.

