Pediatric Nursing
Immunization
Lecture '3'

Miss :kamlah
Lian is 5 years old, has accompanied her mother and 1.5 years old brother, Ahmad, to the pediatric clinic. The primary cause of the visit is that because Ahmad is sick. During assessment, nurse ask the mother about Lian immunization status, mother said that she had not been seen since she was 2 years.
• What immunization should both Ahmad and Lian take?
• Should Lian be given any immunization today even her brother is ill?

• Can all immunization be given at the same time?
• Should Ahmad also receive any immunization today?
Immunization

Is a process that includes administration of antibody or antigen that

Aim to

Build up resistance in child against certain infectious disease

Miss :kamlah
Immunity

• An inherited or acquired state in which the individual is resistant to the occurrence or the effect of specific disease particularly an infectious agent.
## Definitions

<table>
<thead>
<tr>
<th>Antigen</th>
<th>Antibody</th>
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<tr>
<td>• A variety of foreign substances including bacteria, viruses, toxins &amp; foreign proteins that stimulate the formation of antibodies.</td>
<td>• Protein found mostly in serum that is formed in response to exposure to a specific antigen.</td>
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</tbody>
</table>
Normal Blood

- WBCs
- RBCs
- Proteins
- Minerals
- Vitamins
- Platelets

Blood free from antigen
 Doesn't stimulate new proteins in serum (antibody)

Blood with antigen (any type)
 Stimulate new protein in serum (antibody)

Blood+Foreign substance

- Bacteria
- Viruses
- Toxins
- Foreign proteins

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Vaccine

Suspension of microorganisms life by attenuation or inactivation; thus induce immunity to prevent infectious disease.
Types of Immunity

- Active Immunity
- Passive Immunity
Active Immunity

Administrating antigen to human body clinically or subclinically; will stimulate the formation of the antibody → fight the disease.

It has two types

- Natural
- Artificial
Natural Active Immunity

Having the disease will stimulate the formation of antibody.

Administrating the pathogen will stimulate active immunity.

Artificial Active Immunity
Passive Immunity

Providing pure antibody or immunoglobulin extracted from another host (human or animal) that have been immunized against an antigen or naturally from mother to fetus through placenta.

It has two types

- Natural
- Artificial

Miss :kamlah
Natural Passive Immunity

• From mother to baby during pregnancy through placenta to the fetus (IgG) which is important in the first year of life.

• Through breast feeding (IgA) that protect against bacterial infection.

Artificial Passive Immunity

From another host to the child.

e.g. DTP Vaccine

Miss: kamlah
Types of vaccines

1- Live attenuated pathogens.
2- Killed micro-organism.
3- Toxiods.
4- Recombinant form.
5- Conjugated form.
6- Antitoxin.
7- Immunoglobulin.
Live attenuated pathogens

A vaccine that contains a micro-organism in live but attenuated or weakened. E.g. measles & vercella vaccines.

- It multiply inside human host.
- Provides prolonged immunity.
- Do not give immunocompromized patient or pregnant women.
Killed micro-organism

A vaccine that contains a micro-organism that has been killed but is still capable of inducing the human body to produce antibodies.

- Does not multiply in the human host.
- Multiple doses of vaccine are required with subsequent booster doses.
- No possibility of vaccine infection.
**Toxoids**

A toxin (bacteria) that has been treated with heat or chemical to weaken its toxic effects but remain its antigenecity. E.g. Tetanus.

- Derivatives of bacterial exotoxins.
- Remain immunogenic stimulate the formation of the antibodies without causing the disease.
Recombinant form

An organism that has been genetically altered for use in vaccine. E.g. hepatitis B, acellular pertussis vaccine.

Conjugated form

An altered organism joined with another substance to increase the immune response. E.g.(Hib).
Antitoxin

- Solution of antibodies derived from the serum of an immunized animal with antigen.
- Used for passive immunity.

Immunoglobulin

- Sterile solution contains antibodies derived from human blood plasma.
- Used for passive immunity & immunodeficient patients.
# Vaccine components

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<tr>
<th></th>
<th>Live attenuated</th>
<th>Killed</th>
<th>Microbial extract</th>
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<tbody>
<tr>
<td><strong>Bacterial diseases</strong></td>
<td>• BCG</td>
<td>• Typhoid fever</td>
<td>• Pertusis</td>
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<td>• Salmonella</td>
<td>• Cholera</td>
<td>• Diphtheria</td>
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<td></td>
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<td>• Pertusis</td>
<td>• Tetanus</td>
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<tr>
<td><strong>Viral diseases</strong></td>
<td>• Measles</td>
<td>• Polio</td>
<td>Hepatitis B</td>
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<td></td>
<td>• Mumps</td>
<td>• Hepatitis A</td>
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<td>• Rubella</td>
<td>• Rabies</td>
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<td>• Chickenpox</td>
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<td>• Polio</td>
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<td>Measles</td>
<td>الحصبة</td>
<td>Measles</td>
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<td>Mumps</td>
<td>النكاف</td>
<td>Mumps</td>
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<td>Rubella (German measles)</td>
<td>الحصبة الألمانية</td>
<td>Rubella</td>
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<td>Polio</td>
<td>شلل الأطفال</td>
<td>Polio</td>
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<td>Pertussis (whooping cough)</td>
<td>السعال الديكي</td>
<td>Pertussis</td>
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<td>Diphtheria</td>
<td>الدفتيريا</td>
<td>Diphtheria</td>
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<td>Tetanus (lockjaw)</td>
<td>داء الكزاز</td>
<td>Tetanus</td>
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<td>Vercella (chickenpox)</td>
<td>جُديري الماء</td>
<td>Vercella</td>
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<td>Haemophilus influenza</td>
<td>أنفلونزا</td>
<td>Haemophilus influenza</td>
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Miss : kamiah
Why Vaccinate?

<table>
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<tr>
<th>Disease</th>
<th>Prevaccine Morbidity</th>
<th>2000 Morbidity</th>
<th>Decreased %</th>
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<tbody>
<tr>
<td>Smallpox</td>
<td>48,164</td>
<td>0</td>
<td>100%</td>
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<tr>
<td>Diphtheria</td>
<td>175,885</td>
<td>4</td>
<td>100%</td>
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<td>Pertusis</td>
<td>147,271</td>
<td>6,744</td>
<td>95.4%</td>
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<td>Tetanus</td>
<td>1,314</td>
<td>26</td>
<td>98%</td>
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<td>Poliomyelitis</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
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<td>Measles</td>
<td>503,282</td>
<td>81</td>
<td>100%</td>
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<td>Mumps</td>
<td>152,209</td>
<td>323</td>
<td>99.8%</td>
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<tr>
<td>Rubella</td>
<td>47,745</td>
<td>152</td>
<td>99.7%</td>
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</table>
Medication used for pediatric Immunization

1- Diphtheria, pertussis & tetanus Toxiods (DTaP or TdaP).
2- Haemophilus influenza type B.
3- Hepatitis A.
4- Hepatitis B vaccine.
5- Measles, mumps, rubella vaccines.
6- Polio virus vaccine.
7- Rotavirus vaccine.
Bacillus of Camlet Guerin 
BCG

- It is a **life attenuated** vaccine to protect against Tuberculosis (TB).
- It is given **intramuscular. At left deltoid muscle.**
- Given at first month.

- **Side effect:**
  - cold abscess, regional lymphadenitis.
Diphtheria, Pertussis & Tetanus Toxiods

Protect against

- **Diphtheria**: serious infection of the throat & respiratory tract.

- **Tetanus**: a serious neurological disorder that may occur from a contaminated wound.

- **Pertussis**: infection of the respiratory system characterized by severe whooping cough
DTaP

- **Type**: Inactivated.
- **Route**: Intramuscular.
- **Dose**: 0.5 ml.
- **Age given at**: 2, 4, 6, 15, 18 months; 4, 5, 11, 12 years
- **Storage**: in refrigerator without freezing it.
- **Side effects**:
  - **Mild**: redness, pain, swelling, fever (<38°C).
  - **Sever**: allergic reaction, convulsions, unresponsive, fever (>38°C).
Nursing implications:
• Take history of reaction prior to administration.
• Inform parents about side effects.
• If one of the severe symptoms occur, do not give pertussis in next shots.

Contraindications:
• Acute febrile illness.
• Neurological illness as epilepsy.
• Sever reaction to pertussis.
• Vaccine not given cold.
Haemophilus influenza type B.

- Protects against Haemophilus influenza type b.

- A bacteria that causes meningitis, pneumonia, skin & throat infections
Hib

- **Type:** Inactivated.
- **Route:** Intramuscular.
- **Dose:** 0.5 ml.
- **Age given at:** 2, 4, 6, 12, 15 months.
- **Storage:** in refrigerator without freezing it.
- **Side effects:** redness, pain, swelling, and in severe cases: allergic reaction (extremely rare), fever.
- **Nursing implications:**

Take history of reaction prior to administration and if the patient is immunosuppressed; inform parents about side effects.
Hepatitis B vaccine.

- **Type**: Inactivated.
- **Route**: Intramuscular.
- **Dose**: 10 mcg.
- **Age given at**: birth, 2, 4, 6 months; 2-18 years.
- **Storage**: In refrigerator without freezing it.
- **Side effects**: Redness, pain, swelling, fever.
- **Nursing implications**: 
  Shake well; inform parents about side effects.

Solution is cloudy
Hepatitis A

- **Type:** Inactivated.
- **Route:** Intramuscular.
- **Dose:** 0.5 ml (1 ml over 18 years)
- **Age given at:** 12-23 months; 2-12 years.
- **Storage:** in refrigerator without freezing it.
- **Side effects:** redness, pain, swelling, fever, rash.
- **Nursing implications:**
  
  Shake well; inform parents about side effects.
Measles, Mumps, Rubella Vaccine

Protect against:

• **Measles, mumps & rubella**: they are viral infections characterized by rashes, fever, and potentially serious side effects such as heart damage, pneumonia & infertility.
MMR

- **Type**: Live attenuated.
- **Route**: Subcutaneous.
- **Dose**: 0.5 ml.
- **Age given at**: 12-15 months; 4-6 years.
- **Storage**: in refrigerator without freezing it.
- **Side effects**: joint pain, pain, redness, rash, allergic reaction, febrile seizures.
- **Nursing implications**: Take history of reaction prior to administration; inform parents about side effects.

Solution is clear, yellow

Miss :kamlah
**Poliovirus vaccine**

- Protect against *poliomyelitis*, which is viral disease characterized by paralysis of extremities.

- It has two types:
  1. **Sabin oral vaccine**: it is live attenuated virus, easily administer but have short life.
  2. **Salk inactivated vaccine**: it is effective in prevention, have longer life than Sabin, but it has to be injected.
IPV  

Solution is clear

• **Route:** Subcutaneous or intramuscular.
• **Dose:** 0.5 ml.
• **Age given at:** 2, 4, 12, 18 months; 4-6 years.
• **Storage:** in refrigerator without freezing it.
• **Side effects:** tenderness, swelling, irritability.

• **Nursing implications:**

Take history of reaction prior to administration; inform parents about side effects.
Rotavirus vaccine

- **Type**: Live.
- **Route**: oral.
- **Dose**: 2 ml.
- **Age given at**: 2, 4, 6 months; 4-6 years.
- **Storage**: in refrigerator without freezing it.
- **Side effects**: vomiting, diarrhea, irritability, seizures, fever, infections (UTI, Pneumonia).
- **Nursing implications**: No restriction on infant’s intake of formula or breast milk before or after vaccine; inform parents about side effects.

Solution is pale, yellow.
Vericella virus vaccine

Protect against chickenpox, which is viral infection affecting the skin, characterized by rashes cover all over the body.
Vericella virus vaccine

- **Type:** Live attenuated.
- **Route:** subcutaneous.
- **Dose:** 0.5 ml.
- **Age given at:** 12-15 months; 4-6 years.
- **Storage:** frozen.
- **Side effects:** pain, redness, fever, rashes, allergic reaction in severe cases.
- **Nursing implications:**

  Take history of reaction prior to administration and if the patient is immunosuppressed; inform parents about side effects.

Solution is clear, colorless to pale.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Age</th>
<th>Birth</th>
<th>1 month</th>
<th>2 months</th>
<th>4 months</th>
<th>6 months</th>
<th>12 months</th>
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<th>4–6 years</th>
<th>11–12 years</th>
<th>13–14 years</th>
<th>15 years</th>
<th>16–18 years</th>
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<tbody>
<tr>
<td>Hepatitis B¹</td>
<td>* Miss kamlah 39</td>
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<td>Diphtheria, Tetanus, Pertussis²</td>
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<td><em>Haemophilus influenzae type b³</em></td>
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<td>Measles, Mumps, Rubella⁴</td>
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<td><em>Vaccines within broken line are for selected populations</em></td>
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<td>15 months</td>
<td>Hib, Hep A, MMR, Vercella</td>
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<td>18 months</td>
<td>DTaP, Polio</td>
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<td>4-6 years</td>
<td>DTaP, MMR, IPV, Rota, Vercella</td>
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Nursing Interventions

- Administer the correct vaccine to child.
- Application the principle of sterilization at time of administration.
- Administer oral Polio vaccine in proper position.
- Recording vaccine on appropriate record.
- Use sterile syringe & needle in each injection.
- Manage the adverse events when they occur.
Nursing History

Before administrating the medication, check:

1. Is the child sick today?
2. Does the child have allergy to the medication?
3. Has the child serious reaction in the past?
4. Does the child have cancer, leukemia, AIDS?
5. Does the child took any cortisone in the past 3 month?
1. How many shots does my child need & when?
2. What happen if my child miss a shot?
3. Why should I follow an immunization schedule?
4. Why are so many vaccines given at such young age?
5. How serious are the disease?
6. What are the side effect of the medication?
7. What I should do after immunization?
Care after immunization

- Observe any reaction that might occur.
- Check the injection site for pain, redness, swelling.
- Put cold compress, to reduce pain, swelling.
- Administer analgesia to reduce the pain.
- Educate family that symptoms will disappear in 2 days.
- Educate family about side effect that could occur.
- Educate family about when to bring child to hospital after immunization.