

LEPROSY



Presented by
Dr. Ayesha Fatima
Assistant Professor
Dept of Pharmacy Practice

- **Leprosy (Hansen's disease) is a chronic granulomatous infectious disease caused by acid-fast, rod-shaped bacterium known as *Mycobacterium leprae*, primarily affecting the skin, peripheral nerves, mucosa of the upper respiratory tract, and eyes, and characterized by hypopigmented or erythematous skin lesions with sensory loss and progressive nerve damage.**
- If left untreated, the disease can cause progressive and permanent damage to these structures, leading to disfigurement and long-term disability.
- Leprosy has been known since ancient times, with evidence of the disease dating back to around 4000 BC. It was described in the early civilizations of China, India, and Egypt. The earliest written reference to leprosy appears in Egyptian papyrus records from approximately 1550 BC, indicating that the disease has affected humanity for thousands of years.

- The disease can affect individuals of all ages.
- However, the signs and symptoms may take a long time to appear because the causative organism multiplies very slowly.
- The incubation period can range from several weeks to as long as 20 years or more.
- Due to natural immunological protection, only about 5–10% of infected individuals eventually develop noticeable signs and symptoms of leprosy.
- Although humans are the primary hosts, certain animals such as armadillos, chimpanzees, and mangabey monkeys can also serve as reservoirs of infection.

Causative Organism

1. Leprosy is caused by:
Mycobacterium leprae
2. It is: Acid-fast, Rod-shaped bacterium, Obligate intracellular organism, Very slow growing
3. Because it multiplies slowly, symptoms may appear after many years (from weeks up to 20 years).

Mode of Transmission

Leprosy spreads mainly by:

1. Droplets from the nose and mouth,,
2. During close and prolonged contact with an infected person
3. It does NOT spread easily.
4. Only about **5–10%** of infected people develop the disease due to natural immunity.

Some animals that can act as reservoirs:

Armadillos, Chimpanzees, Mangabey monkeys

Signs and Symptoms of Leprosy

The signs and symptoms of leprosy depend on the immune response of the individual to *Mycobacterium leprae*. Different classification systems are used to describe the disease.

WHO Classification

The World Health Organization classifies leprosy into two main types based on lesions and smear results:

1. Paucibacillary (PB) Leprosy

- Two to five skin lesions
- Negative skin smear at all sites
- Includes single lesion leprosy (only one skin lesion)

2. Multibacillary (MB) Leprosy

- Six or more skin lesions
- Or positive skin smear at any site
- More extensive nerve involvement

Ridley–Jopling Classification

The Ridley and Jopling classification divides leprosy into five types based on severity:

1. Tuberculoid leprosy
2. Borderline tuberculoid leprosy
3. Mid-borderline leprosy
4. Borderline lepromatous leprosy
5. Lepromatous leprosy

Operational	Multibacillary, >5 skin lesions		Paucibacillary, 1-5 skin lesions	
Ridley-Jopling*	Lepromatous leprosy (LL)	Borderline leprosy (BL)	Tuberculoid leprosy (TT)	Indeterminate (I)
Clinical findings				
Cellular immunity	Least (Th2 CD4⁺ T-cell response)  Greatest (Th1 CD4⁺ T-cell response)			
Type of lesions	Macules, papules, and plaques and sometimes diffuse infiltration of the skin	Macules, papules, and plaques with variable induration	Infiltrated thin plaques with raised edges, often hypopigmented	Macules, often hypopigmented
Distribution	Symmetric; favors face, buttocks, lower extremities	Tendency to symmetry	Localized, asymmetric	Variable
Definition	Vague, difficult to distinguish normal versus affected skin	Less well-defined borders	Well-defined, sharp borders	Not always defined
Sensation	Not affected	Diminished	Absent	Impaired
Bacilli in skin lesions				Usually none detected

Observation or test	Type of leprosy				
	TT	BT	BB	BL	LL
Number of lesions	Single usually	Single or few	Several	Many	Very many
Size of lesions	Variable	Variable	Variable	Variable	Small
Surface of lesions	Very dry, sometimes scaly	Dry	Slightly shiny	Shiny	Shiny
Sensation in lesions (not face)	Absent	Moderately or markedly diminished	Slightly or moderately diminished	Slightly diminished	Not affected or minimally affected
Hair growth in lesions	Absent	Markedly diminished	Moderately diminished	Slightly diminished	Not affected
AFB in lesions	Nil	Nil or scanty	Moderate numbers	Many	Very many (plus globi)
AFB in nasal scraping or in nose blows	Nil	Nil	Nil	Usually nil	Very many (plus globi)
Lepromin test	Strongly positive (+++)	Weakly positive (+ or ++)	Negative	Negative	Negative

Clinical Presentation of Leprosy

◆ Skin Manifestations

1. Flat or raised reddish/copper-colored patches
2. Hypopigmented or erythematous lesions
3. Nodules or plaques
4. Single or multiple lesions (face, buttocks, extremities)
5. Ulcerations in advanced cases

◆ Nerve Involvement

1. Peripheral neuropathy
2. Muscle weakness
3. Claw hand deformity
4. Foot drop

◆ Sensory Loss

1. Thickened peripheral nerves
2. Loss of sensation (touch, pain, temperature)
3. Numbness in hands and feet

◆ Facial Changes

- Loss of eyebrows and eyelashes
- Thickened facial skin
- Destruction of nasal cartilage (saddle nose deformity)

◆ Eye Involvement

- Eye pain and redness
- Inability to close eyelids (lagophthalmos)
- Corneal ulcers
- Blindness (if untreated)

◆ Other Manifestations

- Testicular involvement → infertility or sexual dysfunction

Diagnosis of Leprosy

Clinical Diagnosis (Cardinal Signs)

Leprosy is diagnosed if at least one of the following is present:

1. Hypopigmented or reddish skin lesion with definite sensory loss
2. Thickened peripheral nerve with sensory/motor deficit
3. Positive skin smear for acid-fast bacilli

Laboratory Diagnosis



Skin Smear Examination

- Taken from earlobes or skin lesions
- Stained using:
 - Ziehl–Neelsen stain
 - Fite-Faraco stain

Detects acid-fast bacilli (*M. leprae*).

Skin Biopsy

- Confirms diagnosis
- Helps in classification (PB or MB)

Other Tests (Less Common)

- Nerve biopsy
- Blood tests
- slit-skin smears

Leprosy Management

- Management of leprosy includes patient education, drug therapy, monitoring, and sometimes surgery.
- Patients should be taught to inspect their hands and feet daily for injuries because loss of sensation can prevent them from noticing wounds.
- Proper footwear and injury prevention are important to avoid ulcers, infections, and disability.
- Completing the full course of treatment is essential for cure and prevention of complications.

Pharmacotherapy

- The World Health Organization (WHO) recommends **multidrug** therapy (MDT) for the treatment of leprosy.
- The standard drugs used are: Dapsone, Rifampicin and Clofazimine
- WHO provides these medicines free of cost in monthly blister packs. After the first supervised dose, patients usually become non-infectious.
- Drug resistance of *Mycobacterium leprae* to MDT is rare.

WHO Recommendations

❶ Paucibacillary (PB) Leprosy

Type	Regimen	Duration
Single lesion PB	Single dose Rifampicin + Ofloxacin + Minocycline	One time
PB leprosy (general)	Rifampicin (monthly supervised) + Dapsone (daily)	6 months

❷ Multibacillary (MB) Leprosy

Regimen	Duration
Rifampicin (monthly) + Dapsone (daily) + Clofazimine (daily + monthly supervised)	12 months

Management of Lepra Reactions

Leprosy reactions are immune-mediated complications.

Type 1 Reaction (Reversal Reaction)

Feature	Management
Acute inflammation of existing lesions	Corticosteroids

Type 2 Reaction (Erythema Nodosum Leprosum – ENL)

Feature	Management
Painful nodules, fever, systemic symptoms	Corticosteroids
	NSAIDs / Salicylates
	Clofazimine
	Thalidomide (in severe cases)

Surgical Management

Surgery is indicated for:

Indication	Purpose
Nerve decompression	Relieve nerve compression
Drain nerve abscess	Prevent further damage
Reconstructive surgery	Restore function
Cosmetic surgery	Improve appearance
Amputation	Severe deformity or non-healing ulcer

Patient education

Prevention of leprosy focuses on interrupting the transmission of *Mycobacterium leprae* and protecting vulnerable individuals. Since leprosy spreads slowly and only a small proportion of exposed people develop the disease, preventive strategies are both practical and effective.

1. Early Diagnosis and Treatment

- Early detection of leprosy cases is the most important preventive measure. Individuals showing signs such as skin lesions with loss of sensation or thickened nerves should be promptly evaluated.
- Prompt initiation of multidrug therapy (MDT) not only cures the patient but also reduces the risk of spreading the infection to others. After the first supervised dose of MDT, patients usually become non-infectious.
- Health workers must actively identify hidden cases in the community to prevent ongoing transmission.

2. Contact Surveillance

- Household and close contacts of leprosy patients are at higher risk of infection.
- Close contacts should be monitored regularly for early signs of leprosy, such as skin lesions, numbness, or nerve thickening.
- Early identification in contacts allows treatment before significant nerve damage occurs.

3. Chemoprophylaxis

- Single-dose rifampicin (SDR) has been shown to provide approximately 57% protection for the first two years in people who are in close contact with newly diagnosed patients.
- SDR is considered safe and practical for use in endemic areas to reduce new cases.
- This strategy is particularly useful in communities with high incidence of leprosy.

4. Vaccination

- Currently, no vaccine offers complete protection against leprosy.
- The BCG vaccine (*Bacillus Calmette–Guérin*), used primarily against tuberculosis, provides partial and variable protection against leprosy in some populations.

Research is ongoing to develop vaccines specifically targeting *Mycobacterium leprae*.

5. Infection Control and Transmission Prevention: Patients should understand that:

- Leprosy spreads through prolonged close contact, mainly via nasal droplets.
- It does not spread through casual contact like handshakes or sharing food.
- Once treatment is started, the risk of transmission reduces significantly.
- Cover mouth and nose while coughing or sneezing.
- Maintain good respiratory hygiene.

6. Education for Household Contacts: Close contacts (family members living with the patient) should:

- ✓ Undergo regular screening for early signs of leprosy.
- ✓ Monitor for skin patches or numbness.
- ✓ Seek evaluation if symptoms appear.

Studies show that a **single dose of rifampicin** given to close contacts reduces the risk of developing leprosy in the first two years.

7. Personal and Community Measures

- Individuals with leprosy should inspect their hands and feet daily to prevent injuries, as loss of sensation increases risk of unnoticed wounds and infections.
- Wearing protective footwear and taking care to avoid burns, cuts, or pressure injuries is recommended.
- Early treatment of ulcers or infections prevents disability and secondary complications.

8. Importance of Complete Treatment

Patients should be counselled that:

- Leprosy is completely curable with MDT.
- Medicines must be taken regularly and for the full prescribed duration (6–12 months or more depending on type).
- Skipping doses may increase complications.
- Stopping treatment early can lead to relapse or disability.

Family members should encourage and support treatment adherence.

9. Public Awareness and Health Education

- Educating the public about early signs of leprosy reduces stigma and encourages people to seek medical care promptly.
- Communities should be informed that leprosy is curable with MDT and that patients on treatment are no longer infectious.
- Awareness campaigns help families and patients adhere to treatment schedules, monitor contacts, and prevent disability.