# LEPROSY

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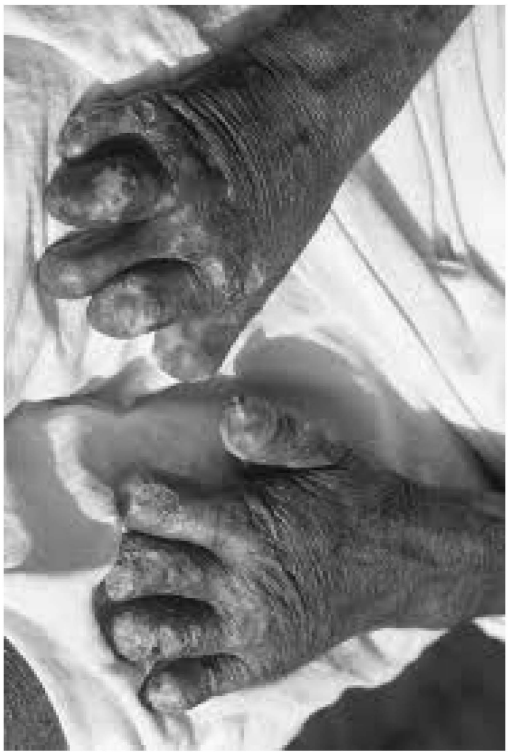
# Specific Learning Objectives

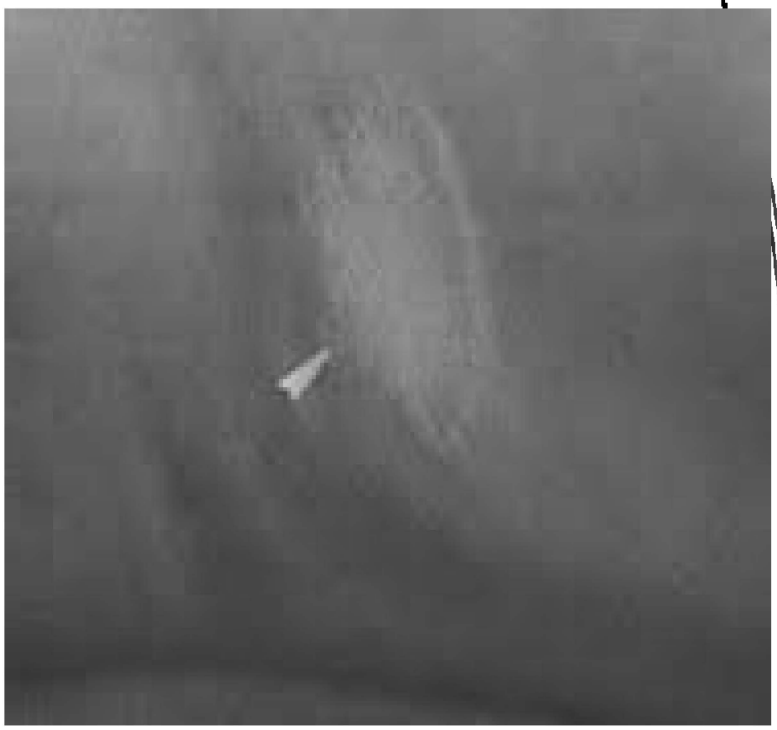
- At the end of session, the learner shall be able to describe:

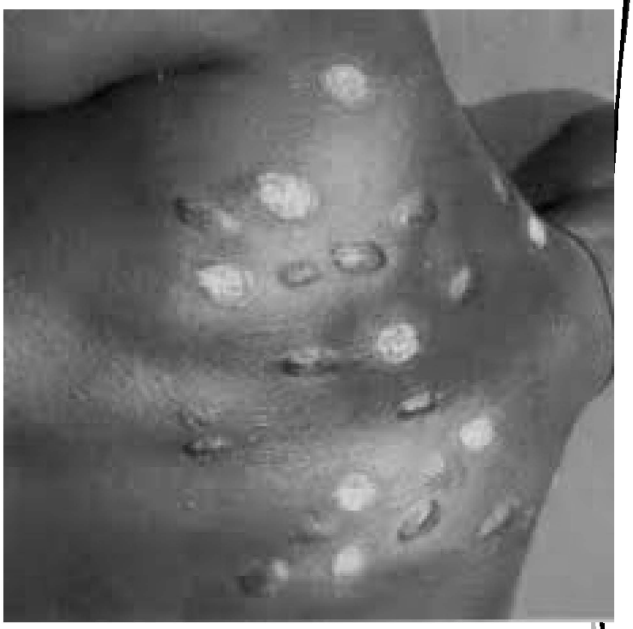
➢ Magnitude of Leprosy Problem

➢ Clinical features of Leprosy

➢ Prevention & Control Strategies







# Leprosy (Hansen's Disease)

- A chronic granulomatous immunological disorder
- Gerhard A Hansen (In 1873)
- *Mycobaterium leprae*
- Primarily affecting the peripheral nerves and secondarily involving skin and mucosal membrane etc.
  - also affects eye, kidney, liver, adrenal glands and in the male, testicles.

# History of the Disease

- The first known written mention of leprosy is dated 600 BC.
- Leprosy was recognized in the ancient civilizations of China, Egypt and India.
- All countries of the South-East Asia Region were known to be endemic for leprosy.
- Throughout history, the afflicted have often been ostracized by their communities and families.

# History

- The date of the initial appearance of leprosy is unknown
- Earliest reference to the disease appears in the year **1500 BC in India**, where leprosy is described as ***kushtha***.
- Subsequently, leprosy appears as ***uchedu*** in a papyrus from **Egypt** (1300 BC-1000 BC),
- as ***tsdraath*** *in* **Israel** (782 BC-732 BC),
- *lai-ping in China* (AD 281-AD 341).
- The name *leprosy :* Hebrew Bible in the year 300 BC.

- For centuries, leprosy was regarded as **divine punishment** for the sin of inappropriate behaviour.
- Leprosy was also considered a hereditary induced by eating hot food, pepper, garlic and the meat of diseased pigs and fish.
- The **infectious nature** of leprosy was recognised in 1749 in the Chinese medical classic *Golden Mirror of Medicine*

# Global Magnitude

- According to official reports received from 103 countries from 5 WHO regions (except European Region),
- ➢ The global registered prevalence of leprosy at the end of 2013 was 180 618 cases.
- ➢ The number of new cases reported globally in 2013 was 215 656 compared with 232 857 in 2012 and 226 626 in 2011.

# Global burden of Leprosy

| WHO Region | Number of cases registered (prevalence/10 000 Population), 2014 | Number of new cases detected (new-case detection rate/ 100 000 population), 2013 |
|---|---|---|
| African | 22 722 (0.38) | 20 911 (3.50) |
| American | 31 753 (0.36) | 33 084 (3.78) |
| Eastern Mediterranean | 2 604 (0.05) | 1 680 (0.35) |
| **South East Asia** | **116 396 (0.63)** | **155 385 (8.38)** |
| Western Pacific | 7 143 (0.04) | 4 596 (0.25) |
| **Total** | **180 618 (0.32)** | **215 656 (3.81)** |

**Weekly Epidemiological Report. No. 36, 2014**

- The overall target for the global elimination of leprosy as a public health problem has been attained.
- The fall in prevalence rate is mainly due to:

➢an improvement in management of cases,

➢very low rates of relapse,

➢high cure rates,

➢absence of drug resistance and

➢shorter duration of treatment with MDT.

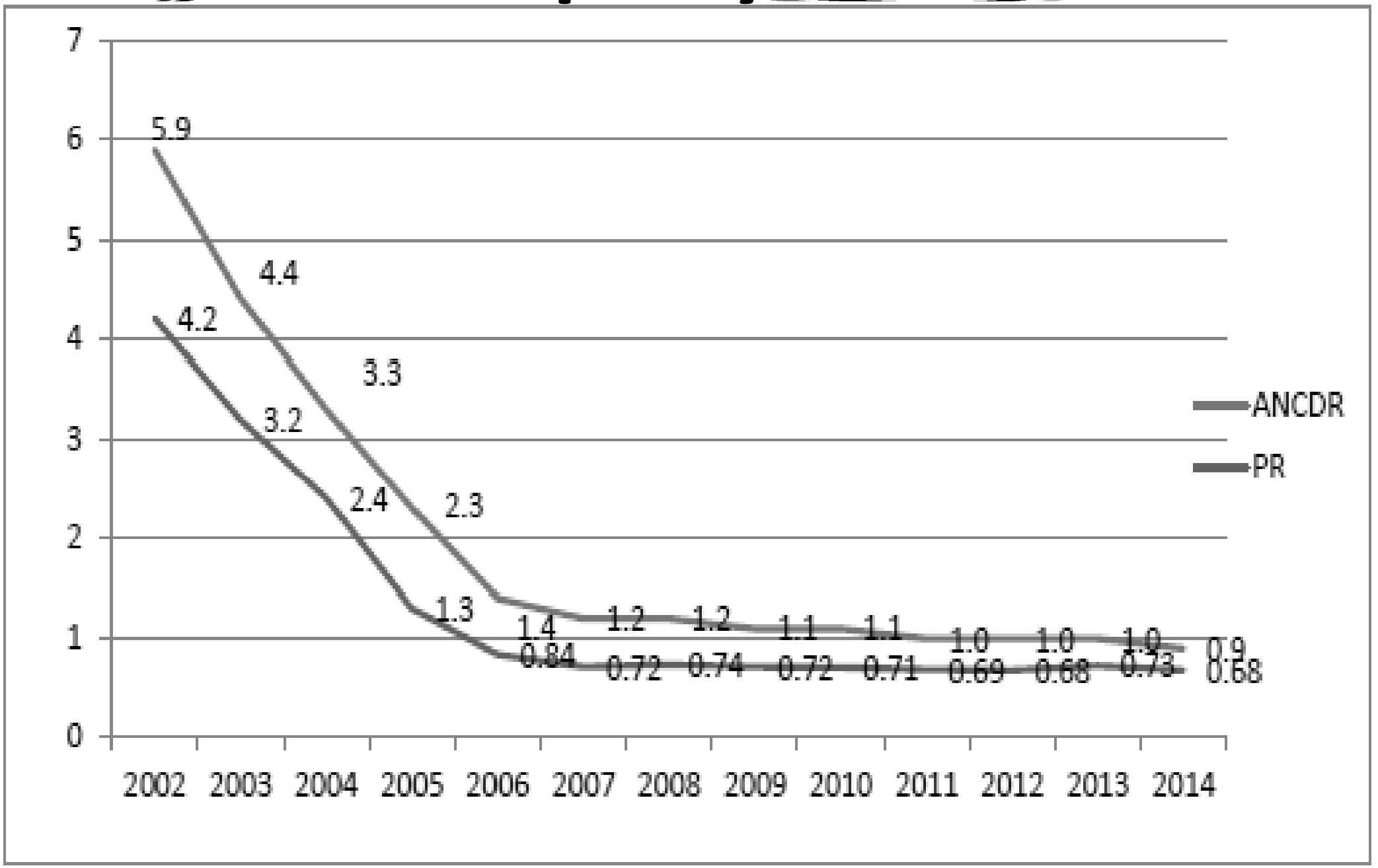
# Leprosy in India

- India contributes to more than 50% of new cases detected globally every year.

- India achieved goal of leprosy elimination in December 2005.

- Three States / UTs viz. Bihar, Chhattisgarh and Dadra & Nagar Haveli has remained with PR between 1 and 2.3 per 10,000 population.

# Trends of Leprosy in India




**ANCDR: Annual New Case Detection Rate; PR: Prevalence Rate**

# Agent

- *Mycobacterium leprae*
- Intracellular, obligatory parasite, acid fast bacilli
- Pinkish red resembling the tubercle bacilli (ZN stain).
- May be arranged in small or large clumps or bundles (called **Globi**) or may occur singly.
- Remain dormant in various sites and cause relapse.
- Other than man, it has multiplied in the footpads of mice, in tissues of immunosuppressed rodents and in the nine - banded **armadillo**.

# Reservoir

- Man is the only known reservoir.
- Natural infection has been reported in Armadillo and certain primates (mangabey monkeys and chimpanzee) but it is not epidemiologically important.

- "**Active or Open**" **cases** who are shedding the organisms mainly through nasal discharges
  - more so in Lepromatous cases are the chief source of infection.

# Host

- **Age:**
  - In areas where leprosy is rare, the first contact may not take place early in life and thus the disease may appear late.
  - However, a high incidence of infection among children means the disease is active and spreading.
  - Incidence rates are highest in 20 to 30 yrs of age group.

- **Gender:**
  - In general, leprosy is more commonly seen in men than women due to their greater mobility and increased opportunity to contact the infection.

- **Immunity:**
  - Only a few people exposed to infection develop clinical signs of leprosy, although immunological conversion takes place in large proportions of contacts.
  - the effective immune response in leprosy is a cell - mediated one.
  - In lepromatous leprosy there is a complete breakdown in the cell mediated immune response.

- **Migration:**
  - Once considered to be a rural problem in India.
  - Leprosy is creating a problem in urban areas also.

- **Socio-economic fators:**
  - generally associated with poverty and related factors like overcrowding

- **Environmental factors**
  - Presence of infectious cases in the environment
  - Humidity favors survival of M. leprae as Can remain viable
  - for 9 days in dried nasal secretions
  - for 46 days in moist soil at room temperature.

# Socio-economic impact

- Leprosy is a leading cause of permanent disability in the world
- Predominantly affects the poor marginalized people.
- Often afflict individuals in their most productive stage of life and therefore impose a significant social and economic burden on society.
- Social burden upon affected individuals and their families.
- Patients are often shunned, stigmatized, isolated and sometimes displaced from their work, marriage and social set-up, needing care and financial support leading to further insecurity, shame, and consequent economic loss.

# Mode of Transmission

- The **major exit points** of *M. Leprae from* untreated lepromatous patients are the **nose**, mouth, and in some cases abraded skin lesions.

- **Mode of entry**, most likely sites of entry are skin and nasal mucosa.
- The bacilli from nasal discharges of infectious patients gain entrance through the skin or respiratory tract.

- Untreated lepromatous patients act as 'source case' or 'pool of infection' in the community.

- The different mode of transmission are :

**a) Droplet infection :**

- This is likely to be the major route.
- This includes aerosols containing bacilli discharged from Respiratory tract.

**b) Contact transmission :**

- Including Direct (skin - to – skin) and Indirect (soil and fomites).

**c) Other routes (Doubtful) :**

- These include possibly Breast milk and Tattooing needles.

**Incubation Period :**

- From few weeks to even 20 years
- an average of 3 - 5 years.
- Tuberculoid type has shorter incubation period.

**Communicability :**

- A patient is infective, if morphologically solid - staining (viable) bacilli are demonstrable.

**Attack rate:**

- Among household contacts: 4.4% - 12%

# Clinical features

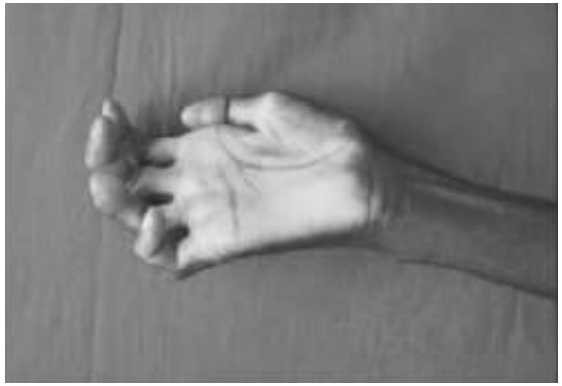
i. Skin lesions (Infiltration, macules, papules, tubercles and nodules)

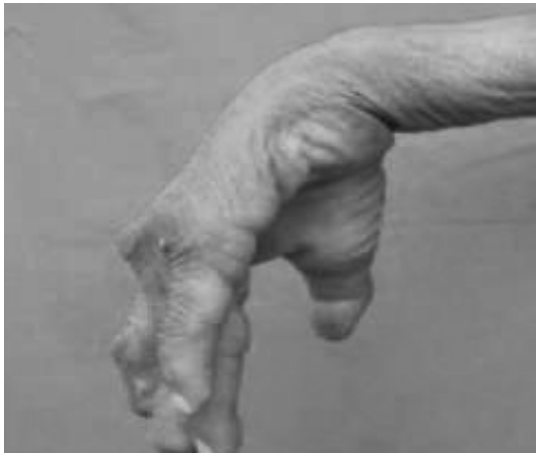
ii. Paraesthesia (History of numbness and loss of hot and cold sensations in the extremities)

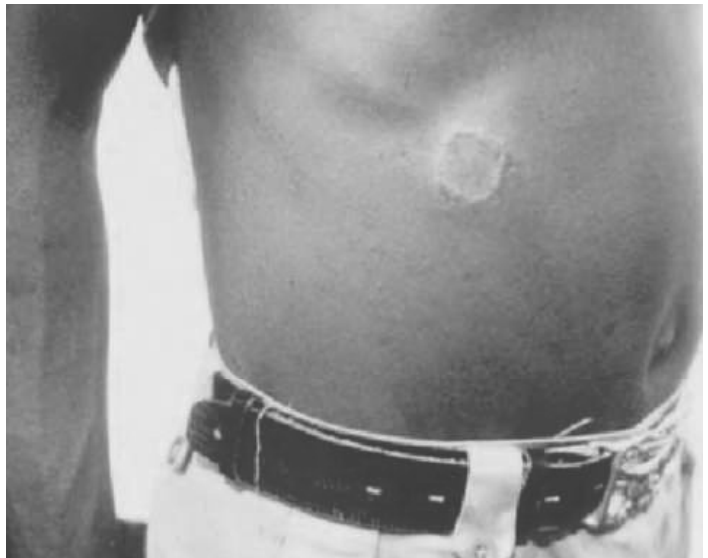
iii. Thickening of nerve trunks

- Ulnar, Lateral Popliteal and Posterior Tibial nerve

iv. Anhidrosis







- **At least one** of the following **cardinal** (unique & very important) **signs** must be present to diagnose leprosy.

i. Hypopigmented or reddish **skin lesion(s)** with definite sensory deficit

ii. Involvement of the **peripheral nerves**, as demonstrated by definite thickening with loss of sensation and weakness of the corresponding muscles of the hands, feet or eyes,

iii. Demonstration of **M leprae in the lesions** (Slit skin smear).

- ***A person with cardinal signs of leprosy and yet to complete full course of MDT may be called as "case of leprosy".***

# Diagnosis

- Clinical features
- Skin smears, nasal smears, nasal scrappings:
  - paucibacillary vs. multibacillary leprosy.
- Histamine test
- Lepromin test (Mitsuda reation):
  - postive test indicates good prognosis
- Other tests :
  - Lymphocyte Transformation Test (LTT), Leucocyte Migration Inhibition Test (LMIT), Fluorescent Leprosy Antibody Absorption Test (FLA - ABS test), and ELISA.

# Classification of Leprosy

- Based on clinical, bacteriological, immunological and histological status of patients.
- The various classifications are :

1. **Indian classification**
2. Madrid classification
3. Ridley and Jopling classification
4. WHO operational classification

# Indian classification

- It is **clinico - bacterial classification** and described as:

## (a) Indeterminate type :

- Early cases with one or two vague hypopigmented macules
- with and without sensory impairment.
- Lesions are bacteriologically negative.

## (b) Tuberculoid type :

- Cases with one or two well defined lesions which may be flat or raised, hypopigmented or erythematous and
- anaesthetic.

## (c) Borderline type :

- Cases with four or more lesions which may be flat or raised, well or ill defined, hypopigmented or erythematous
- sensory impairment or loss.
- Bacteriological positivity is variable and
- if left untreated can progress to lepromatous type.

## (d) Lepromatous type :

- Cases with diffuse infiltration or numerous flat or raised lesions, symmetrical without any sensory loss.

## (e) Pure neuritic type :

- Cases show nerve involvement but do not have any lesion in skin.
- Cases are bacteriologically negative.

- In 1987, WHO study group endorsed that all the patients showing smear positivity should be classified as having multibacillary leprosy for the purpose of MDT treatment.
- Same study group in 1993 gave clinical classification into two groups:

| **Characteristics** | **Paucibacillary (PB) Leprosy** | **Multibacillary (MB) Leprosy** |
|---|---|---|
| Skin lesions | 1-5 | 6 & above |
| Peripheral nerve | 0-1 involvement | >1 involvement |
| Skin smear | Negative | Positive |

# Prevention and Control

- Estimation of the problem
- Early case detection
- Stop the infection with chemotherapy.
- Treat infections
- Educate the patient about leprosy.
- Prevent disability.
- Support the patient socially and psychologically.

# Estimation of the problem

- Epidemiological surveys to find
  - Prevalence
  - Age and gender distribution
  - Various forms of leprosy
  - Health facilities available.

- Total prevalence (an estimate): Four times the cases found in all school age children.

# Early Case Detection

- Contact survey
  - (< 1 case per 1000 population)
- Group survey
  - (1 or more case per 1000 population)
- Mass survey
  - (10 or more case per 1000 population)

# History of Treatment

- The first breakthrough occurred in the 1940s with the development of the drug Dapsone, which cured the disease.
  - But the duration of the treatment of leprosy was many years, even a lifetime, making it difficult for patients to be regular in their treatment.
  - In the 1960s, M. leprae started to develop resistance to dapsone.

- In 1981, a World Health Organization (WHO) Study Group recommended multi-drug therapy (MDT), a combination of three drugs.

# Multi Drug Therapy (MDT)

| Leprosy | Drugs | Dosage (mg) | Frequency | Duration (months) |
|---|---|---|---|---|
| MB | Rifampicin<br>Dapsone<br>Clofazimine<br>Clofazimine | 600<br>100<br>300<br>50 | Once monthly<br>Daily<br>Once monthly<br>Daily | 12 |
| PB | Rifampicin<br>Dapsone | 600<br>100 | Once monthly | 6 |

**Appropiate dosage based on body weight:**

- **Rifampicin: 10 mg per kg**
- **Clofazimine: 6 mg per kg monthly and 1 mg per kg daily**
- **Dapsone: 2 mg per kg daily.**

# Rehabilitation

- It is an important aspect of leprosy control.
- It means the medical, surgical, social, educational, and vocational restoration as far as possible of treated patients to normal activity so that they resume their place in the home, in society and industry.
- Early treatment helps in disability limitation.

# Health education

- The education should be directed towards general public and to patients helping them develop attitudes and behaviour by their own actions and efforts and seeking professional help whenever required.
- Early recognition of symptoms, prompt diagnosis, health seeking behaviour, personal care, treatment adherence and rehabilitation are important aspects of health education.

# LEPROSY IS CURABLE.