TUBERCULOSIS IN SAUDIA ARABIA

LOCATION:

SAUDIA ARABIA:
HOLY PLACES:

OIL:
TB situation in the Region

Country profile

Saudi Arabia

<table>
<thead>
<tr>
<th>Year</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (thousands)</td>
<td>19494</td>
<td>20181</td>
<td>20899</td>
<td>20346</td>
<td>21028</td>
</tr>
<tr>
<td>Population covered by DOTS (thousand)</td>
<td>10032</td>
<td>20346</td>
<td>21028</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOTS population coverage %</td>
<td>48</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated cases of pulmonary TB smear positive *</td>
<td>4180</td>
<td>4069</td>
<td>4206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases notified in DOTS areas (all cases)</td>
<td>1678</td>
<td>3452</td>
<td>3327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases notified in DOTS areas (smear positive)</td>
<td>931</td>
<td>1595</td>
<td>1665</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment success rate under DOTS (%)</td>
<td>66</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOTS case detection rate for new smear positive (%)</td>
<td>22</td>
<td>39</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Latest estimated incidence (Smear positive cases/100 000 population): 20
**Table 1.** Age/sex distribution of the patients with resistant isolates

<table>
<thead>
<tr>
<th>Age/sex</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.** Pattern of resistance to antituberculosis drugs among isolates from 678 patients with tuberculosis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug 1</td>
<td></td>
</tr>
<tr>
<td>Drug 2</td>
<td></td>
</tr>
<tr>
<td>Drug 3</td>
<td></td>
</tr>
</tbody>
</table>
The overall rate of resistance to anti-tuberculosis drugs in this study (22.6%) is higher than in Riyadh (13.2%) but lower than in Gizan (44%). Rifampicin use to treat infections other than TB such as brucellosis and leishmaniasis is common. Furthermore, rifampicin is being commonly prescribed for simple bacterial infections like pharyngitis or urinary tract infection, especially in the private sector.

**Table 3.** Frequency of resistance to each of the antituberculosis drugs among 153 patients with resistant isolates
T.B. is a common disease and poses a major health problem in almost all countries, Saudi Arabia is not an exception. It infects about one-third of the earth population. And it still kills more people than other infectious disease. This is a cross-sectional retrospective study conducted in AI-Madinan Chest Hospital on all patients with confirmed T B. The main objective of this study was to determine the pattern of clinical presentation of T B in patients seen in the year 1998-1999. It also aim to determine the various factors affecting this clinical presentations. A pre-tested check list was used to collect the relevant information. A total number of 434 patients of these 52.3% were female, 47.7% were male. Saudi patients constitute 42.17% of the total cases with female predominance (23.27%). Non-Saudi patients represented 57.83% of the total cases, with slight predominance of the females. Saudi patient were younger than the Non-Saudi patients. The most frequent age group was aged between 20 and < 30 years (30%). The family size ranged from 1 -15 individuals per family. Percentage of patient's who had another member of their family with T B is 6.9%. Of the Non-Saudi patients, Pakistani patients constituted the largest proportion (13.4%) Extra pulmonary TB accounted for 77.4. [30th pulmonary TB and extra pulmonary TB were found more
frequently in the Non-Saudi female.

The most common presentation of extra-pulmonary TB was arthritis (22.6%). The most frequent presenting symptoms of Pulmonary TB were fever, productive cough and dispnea were 81.17%, 80.27%, 67.1% respectively. The symptoms and the sign of TB were found in a different percentage between Saudi and Non-Saudi patients. D.M. was the most frequent predisposing disease found in (13.4%) of the total No. of the patients. Few cases of HIV and Renal failure were reported. A significant association between socio-economical status (S.E.S), bad hygienic conditions, crowd ness, and smoking with TB was seen in high proportion. Corticosteroids, consumption of alcohol, and immune-suppressive drugs were the predisposing factors in a minority of patients. A strong and positive correlation between occupation and education of the patient and disease were see. P = 0.000 So the investigator Can say that the pattern of clinical presentation of TB seen in the year 1998-1999, ill Madinan Chest Hospital does not differ so much from what was reported elsewhere in the Kingdom except in that hoarseness, HIV, Renal failure which were not reported in the 5 comparative studies. This could be attributed to the increase in the (unusual presentation) of TB.
T.B facts:
" #1 cause of infectious disease-related death in the world.
" 1.9 billion have TB in the world (1996 report)
" TB kills more people than all other infectious disease combined.
" One person acquires TB every second.
" 1/3 of the world's population is infected with TB.

BACTERIOLOGY:
1. Disease caused by infection with Tuberculosis or M. Bovis bacillus.
5. Slow-growing.
PATHOGENESIS AND PATHOLOGY:
A. TRANSMISSION
1. Inhalation
2. Ingestion
PATHOGENESIS AND PATHOLOGY:

B. PATHOGENESIS

1. 3-10 week cellular immune response.
   A. Lymph transport.
   B. Hematogenous transport.

2. Macrophage phagocytosis.

3. Active T. B.:
   A. 5% initially
   B. 5% lose ability to control infection.
   C. Endogenous activation.

4. Location:
   A. Lung Parenchyma.
   B. Apices.
5. Spread of Disease:
   A. Bronchogenic (adult)
   B. Lymphatic & Hematogenous (children).

6. Extra pulmonary Involvement:
   A. Kidneys
   B. End of long bones
PATHOLOGY:

1. Histopathologic appearance—pneumonia
   “Exudative T.B.”

2. Granulomatous lesions (growth).

3. Cavity formation.

4. Peripheral scarring.
CLASSIFICATION:


   Minimal - advanced, active/inactive.

B. New - primary

   - secondary
Classification:

1. Primary Infection:
   ” Granulomas
   ” Ghon Complex

2. Postprimary or Reactivation Infection
   ” Miliary Tuberculosis.

CLINICAL SIGNS:

1. Often asymptomatic.

2. Fatigue, low grade fever, weight loss.

3. Chronic cough, sputum production and hemoptysis.

4. Pleuritic chest pain, chills.

5. Pleural effusion.

CLINICAL DIAGNOSIS:

1. History

2. Skin test (PPD-Purified Protein Derivative)- Mantoux test
   
   A. Delayed hypersensitivity reaction.
   
   B. 0.1 m. (5 T.U.) intracutaneously or forearm (read 48-72 hours later)
   
   C. Positive test > 10mm in duration.

D. Individual variables
   
   1. 5% of infected population anergic.
   
   2. Host immunologic condition.
   
   3. Other mycobacteria infection.
Tuberculin Testing

0.1 ml tuberculin (5 TU) injected just under skin surface of forearm. Pale elevation results. Needle bevel directed upward to prevent too deep penetration.

Test read in 48 to 72 hr.
Extent of induration determined by direct observation and palpation; limits marked. Area of erythema has no significance.

Diameter of marked indurated area measured in transverse plane. Reactions over 9 mm in diameter are regarded as positive; those 5 to 9 mm are questionable, and test may be repeated after 7 or more days to obtain booster effect. Less than 5 mm of induration is regarded as negative.
DIAGNOSIS:

3. Sputum smear and culture
   A. Smear -10,000 bacteria/ml sputum required for positive smear.
   B. Culture - slow growth.

4. CXR:
   A. Characteristic findings:
      1. Lesion
      2. Upper lobe (apical or posterior segments) or lower lobe (superior segment) infiltrate.
      3. Localized fibrosis
      4. Localized calcification.
      5. Cavitations
   B. Differential diagnosis
      1. Bacterial pneumonia
      2. Carcinoma
3. Abscess

4. Fungal disease

C. Serial CXR comparison

5. Biopsy – Fiber optic Bronchoscope
**Sputum Culture**

**Concentration and decontamination**
- Equal amounts of 4% NaOH plus 0.5% H acetyl-cysteine added to sputum, shaken for 1 minute and incubated at room temperature for 15 to 30 minutes. This kills most contaminants but also kills some M. tuberculosis.
- Specimen centrifuged for 15 minutes and supernatant decanted.
- Sediment diluted with 0.5 ml water or albumin, neutralized with phosphate buffer (pH 6.8), then spread over plates or slants of medium.

**M. tuberculosis** on slant of Löwenstein-Jensen agar, egg-containing or Mycobacterium-containing medium, non-pigmented or buff colored and rough.

**M. kansasii** colonies on Löwenstein-Jensen medium. Orange pigmentation seen only after exposure to light.

**Drug susceptibility testing**
- **Direct.** Medium in each of 3 quadrants contains a different drug. 4th is control. Diluted sediment added as each drug is tested in 2 or 3 concentrations. INH 0.2 and 1.0, EMB 5.0, 15.0, and 30.0, RFP 0.2, 0.5, and 1.0; and SM 2.0 and 10.0 mg are most frequently tested.
- **Indirect.** Organisms are first cultured and then measured aliquots of culture are spread over agar in varying concentrations as well as control.
  - INH = isoniazid, EMB = ethambutol,
  - RFP = rifampin, SM = streptomycin.

**FIGURE 20-3** Typical chest radiograph for tuberculosis. Note the cavity lesion in the right upper lobe.
Treatment:

Basic Principles

" Effective Multidrug Regimen
" Organism susceptible to at least of the drugs used.
" Respond within time.
" No single drugs added to a failing program.
" Treat for a sufficient period of time.
"Monitor patient compliance.

TREATMENT:

A. HISTORY
   1. Sanitariums-isolation, bed rest
   2. Collapse therapy - pneumothorax,
      extra pleural plombage.
   3. Resection.

B. CHEMOTHERAPY
   1. Isoniazed (IHN)
   2. Rifampin (RmM)
   3. Ethambutol (EMB)
   4. Streptomycin (SM)
   5. Para-aminosalicylica Acid (PAS)
   6. Pyrazinamide.
Treatment:

6-month regimen:
- 2-month period of daily isoniazid, rifampin, pyrazinamide and either ethambutol or streptomycin followed by isoniazid and rifampin given daily or twice weekly for 4 months.

9 month regimen:
- 1 to 2 months of daily isoniazid and rifampin followed by twice-weekly isoniazid and rifampin for a duration of 9 months.

Regimens for less than 6 months:
- Not recommended.

Symptoms:
- Prolonged fever.
- Night sweating.
- Anorexia.
- Decreased activity.
- Weight loss.
Recommendations:

- The use of rifampicin in conditions other than tuberculosis should be restricted.
- Pyrazinamide should be added in the first 2 months to the regimen of isoniazid and rifampicin.
- This uncertainty has been reported by other investigators.
- Use of at least three drugs in the first 2 months (rifampicin, isoniazid, and pyrazinamide) with the addition of ethambutol or streptomycin in previously treated patients. Ethambutol should be maintained for previously untreated cases.
- A national (as opposed to regional) register should be established in order to trace relapsed cases.
- Continuous surveillance of the problem of resistance is mandatory.
- Evidence from other countries supports the view that high rates of
resistance could jeopardize the benefits of DOTS."

**Conclusion:**

- This area socioeconomic conditions that are different from those prevalent in Riyadh where the income is much higher.
- Ministry of Health it was found that compliance with anti tuberculosis treatment was worse in that region with over 50% of patients not completing the 6-month course.
- Saudi Arabia and Thailand, where rifampicin is affordable and indiscriminately prescribed for tuberculosis and other infections, have experienced rising levels of rifampicin resistance.
- The recommended duration of rifampicin therapy for brucellosis is 6
- Rifabutin for prophylaxis against *M. avium-intracellulare* create resistant of *M. tuberculosis* to Rif (HIV USA).
Does DOTS affect the outcome in resistant TB cases in Saudi:

- Int J Tuber Lung Dis 2002 Jul 6(7) 585-591
- Single R, Riyadh Kingdom of saudi arabia
- Total of 515 patients
- 139 deported or transferred
- 376 sensitive strain
10 defaulted
One died
3 pats lost
18 Resist to Rif mom resist
2 relapsed later
39 Rif Resist W| other
Two failed
Three Relapsed
8 MDR
2 failed
One relapsed
MDR-TB W| or W|out Rif resist
3mon duration to clear the smear is inferior to sensitive strains.

Prepared by:
ABEER S. AL-GHAMDI