Causal analysis and treatment protocols for tuberculosis

TUBERCULOSIS RESEARCH CENTRE, CHENNAI

Table 1. Causes of conditions leading to tuberculosis (by significance)

	Direct (normally clinical)	Indirect (diet, exercise, alcohol)	Distant (sociopolitical, economic, empowerment, gender, literacy, etc.)
Main causes	Bacterial infection (*Mycobacterium tuberculosis*)		
Predisposing factors	• Diabetes mellitus • HIV infection • Silicosis • Close contact (especially of young children below 6 years of age) with smear-positive TB patients • Unimmunized child, especially for extrapulmonary TB • Incompletely treated known open case of TB • Patients on immunosuppressive therapy • Lack of diagnostic and treatment facilities	• Malnutrition • Smoking • Alcoholism	• Lack of political commitment • Poverty/low socioeconomic status • Overcrowding • War/famine • Illiteracy • Stigma associated with TB • Lack of community awareness • Males more than 45 years of age are at higher risk of developing TB

References

Diabetes and TB

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HIV and TB

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Malnutrition

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Poverty

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Smoking

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Listing interventions for tuberculosis (by significance)

Medical interventions

1. Chemotherapy for tuberculosis
   a. Ambulatory, domiciliary treatment
   b. Supervise chemotherapy (Directly Observed Treatment [DOT]) as standard of care
   c. Intermittent chemotherapy
   d. Short-course daily regimen (6–8 months)
   e. Short-course intermittent regimen
   f. Evolved shorter duration (4 months) regimen with inclusion of ofloxacin
   g. DOT with patient-wise box concept in Revised National Tuberculosis Control Programme (RNTCP)
   h. Decentralized supply of drugs

2. Prophylaxis
   a. Chemoprophylaxis for young close contacts of sputum-positive patients
      Isoniazid 5 mg per kg body weight for 6 months
   b. Immunoprophylaxis—bacille Calmette-Guérin (BCG)

3. HIV and TB

   Antituberculosis treatment (ATT) as for HIV-negative TB patients and management with antiretroviral drugs

4. Diabetes mellitus and TB

   ATT as for non-diabetic TB patients and management of diabetes

5. Silicosis

   Screen for TB once in six months and ATT as for non-silicotic TB patients

Non-medical interventions

1. Alcoholism and smoking—focused information, education and communication (IEC) activity

Other interventions

1. Political commitment
2. Involvement of the private sector
3. Community awareness and involvement
4. Training and re-training of health personnel
5. Poverty alleviation programmes

Table 2. Listing interventions for tuberculosis (by significance)

		Non-medical interventions/prevention		
Outcome	Medical interventions	Exercise	Nutrition	Others
Manifestation type 1 (smear-positive pulmonary TB)	• Mainly chemotherapy, surgical intervention rarely required • Immunoprophylaxis—BCG • Chemoprophylaxis—isoniazid 5 mg/kg body weight daily for 6 months • Treatment of HIV-infected/AIDS cases • Strategies for prevention of HIV infection —as per NACO guidelines • Silicosis: Screen patients with silicosis once in 6 months and treat for TB when necessary	• Lifestyle modification so that the incidence of diabetes mellitus could be reduced • Interventions to deal with alcoholism and smoking	Interventions to prevent, treat/reduce malnutrition, both in children and adults	• Health education for raising community awareness about TB, its treatment (that treatment has to be completed), about the role of BCG vaccination, etc. • Interventions to reduce poverty and improve the economic condition of the people
Manifestation type 2 (smear-negative pulmonary TB)	Chemotherapy			• Training • Incentives
Manifestation type 3, etc. (extrapulmonary TB)	• Chemotherapy • Surgery			Monitoring and supervision

It would be good to relate this to the table wherein cases have been enumerated. Based on those causes, interventions could be derived, so that no intervention is missed.

References

Extrapulmonary TB

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Immunoprophylaxis

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TB in children

1. Central TB Division. RNTCP: TB in children: Consensus guidelines of pediatricians, TB experts and TB control programme managers. Nirman Bhavan, New Delhi: Directorate General of Health and Family Welfare; 2004.

Males more than 45 years and TB

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Illiteracy

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Silicosis

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Table 3. Standard treatment protocol for tuberculosis

Conditions	Type	Tests (by type)	Drugs (dosage, type and duration)	Inpatient stay
Manifestation type 1	• Smear-positive pulmonary TB *M. tuberculosis*	Sputum smear for AFB and sputum culture for	• RNTCP-recommended treatment regimens Category I—isoniazid (600 mg), rifampicin (450 mg), pyrazinamide (1500 mg) and ethambutol (1200 mg), thrice a week on alternate days. Duration: 6 months Category II—Inj. streptomycin in addition to the above drugs. Duration: 8 months	Inpatient treatment generally not required. However, a small group of patients (10%) may need admission on account of severity of illness or complications of disease or treatment.
	• Re-treatment cases		• Paediatric dosage: Generally Category III regimen is prescribed for children. Isoniazid: 10 mg/kg, rifampicin: 10 mg/kg, Pyrazinamide: 30–35 mg/kg, ethambutol: 30 mg/kg, Streptomycin: 15 mg/kg	
Manifestation type 2	Smear-negative pulmonary TB	Sputum for smear preparation and culture, and chest X-ray	Category III—Regimen similar to Category I, except ethambutol. Duration: 6 months	
Others	Extrapulmonary TB	Tissue biopsy for histopatho-logical examination and culture for MTB, fine-needle aspiration smear for AFB and cytology	Category III (Duration: 6 months)	

AFB: acid-fast bacilli

References

Sputum smear for AFB

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2. Baily GV, Savic D, Gothi GD, *et al.* Potential yield of pulmonary tuberculosis cases by direct microscopy of sputum in a district of South India. *Bulletin of the World Health Organization* 1967;**37:** 875–92.

Sputum culture for *M. tuberculosis*

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X-ray

1. Larbaoui D, Grosset C, K Abderrahim, *et al.* The efficiency of methods of diagnosing pulmonary tuberculosis: An investigation in a chest clinic in Algiers. *Tubercle* 1970;**51:**403–11.
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Treatment regimen

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Note: The focus of the National Commission on Macroeconomics and Health is on the health care delivery system at the primary and secondary levels of health care—from the district hospital downwards.

Responsibilities of health personnel at different levels

DTC–DTO

Preparation of quarterly report, supervision and monitoring, networking with other sectors, organization of training.

Primary health centre

Medical officer

- First visit—selection of TB suspects, history-taking, ordering sputum examination
- Second visit—categorization for treatment regimens, counselling, start treatment card, selection of DOT provider (DP), visit to the patient for default retrieval, weekly review, preparation of monthly report—programme management
- ANM/staff nurse: They have been identified as DPs and health educators.

Microscopy centre

- The role of the MO, staff nurse and ANM are the same as in the PHC.
- Laboratory technician
- Sputum microscopy—sputum for AFB, preparation of laboratory monthly report, disposal of infectious material.

The equipment required is a binocular microscope.

Subcentre

- VHN/ANM, MPW-M
- Duties as DP—provide drug under observation, maintain treatment card, carry out default retrieval and facilitate sputum examination at stipulated intervals.

Drugs—patient-wise box of RNTCP drugs, symptomatic drugs such as antihistamines, antacids, analgesics, etc.