

Manage TB
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Lecture – 44
Management of TB in special situations

Good morning; today we will be seeing the Management of TB in special situations. I am Dr. Bhavani scientist, working at National Institute for Research in Tuberculosis.

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The slide features a vertical blue bar on the left with the text 'Manage TB' at the top, 'ICMR - National Institute for Research in Tuberculosis (NIRT)' in the middle, and the website 'www.nirt.res.in' at the bottom. To the right of the bar, the title 'TB Co-morbidities' is displayed in blue. Below the title is a bulleted list of co-morbidities. On the right side of the slide is a photograph of Dr. P. K. Bhavani, a woman wearing a purple and pink patterned saree, standing and speaking.

- Diabetes mellitus
- Pregnancy and Lactation
- Liver disorders
- Renal disorders
- Seizure disorders
- Psychosis
- Under-nutrition
- Social habits - Tobacco, alcohol intake

The commonly encountered co-morbidities along with TB are diabetes mellitus, pregnancy and lactation, liver disorders, renal disorders, seizure disorders, psychosis under nutrition and social habits like tobacco and alcohol intake.

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PLoS Med 2008,5:e152.
National framework for TB & Diabetes, March 2017

TB and Diabetes

- Globally about 10% of TB cases have diabetes Mellitus
- Diabetics have 2-3 times higher risk for developing TB compared to normal people
- Good control of Hyperglycaemia is crucial for good TB treatment outcome

The commonly associated co morbidity with TB is diabetes with the increasing global prevalence of diabetes; especially in low and middle income countries where TB is already an endemic we might encounter a increasing number of TB and diabetic co-infected patients in the near future.

Recent medical evidences reports that globally about 10 percentage of TB cases are having diabetes mellitus and diabetics have 2 to 3 times higher risk of developing TB, compared to normal people.

So, good control of hyperglycaemia is crucial for good TB treatment outcome.

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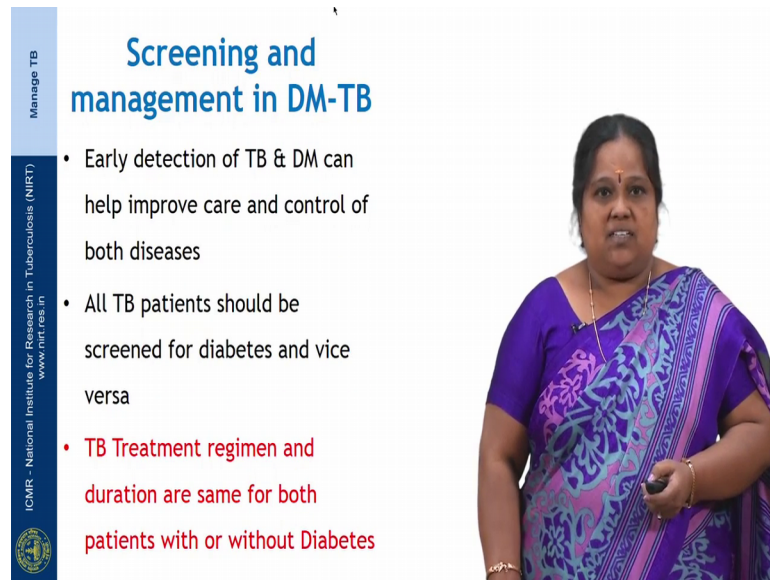
Baker et al.BMC Medicine 2011,9:81

TB and Diabetes

- Diabetes are more likely to have
 - delayed sputum smear/ culture conversion
 - poor treatment outcomes & relapse after treatment
 - higher risk of death during TB treatment

Diabetics are more likely to have delayed sputum smear and culture conversion, poor treatment outcomes and relapse after treatment and higher risk of death during TB treatment. So, this possess an great concern for the TB control program.

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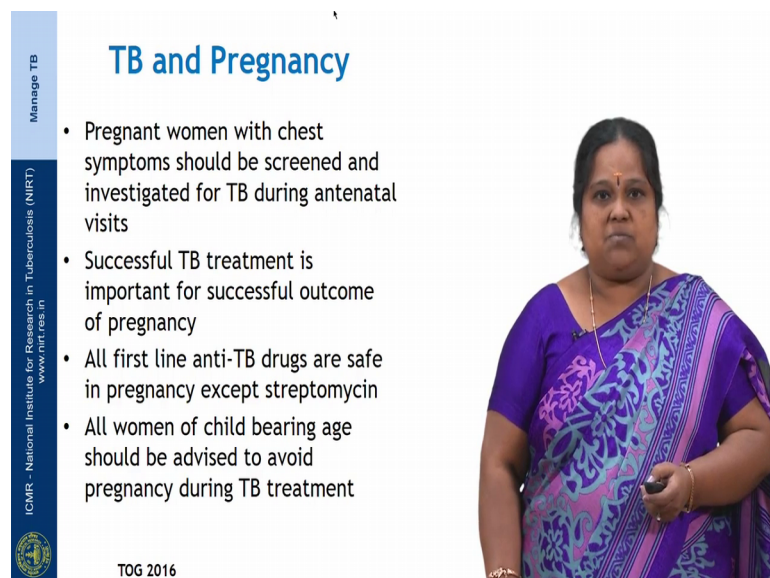


The slide is titled "Screening and management in DM-TB". It features a vertical sidebar on the left with the text "Manage TB" at the top, "ICMR - National Institute for Research in Tuberculosis (NIRT)" in the middle, and "www.nirt.res.in" at the bottom. The main content area contains three bullet points: "Early detection of TB & DM can help improve care and control of both diseases", "All TB patients should be screened for diabetes and vice versa", and "TB Treatment regimen and duration are same for both patients with or without Diabetes". A woman in a purple saree is standing on the right side of the slide, holding a small object in her hand.

- Early detection of TB & DM can help improve care and control of both diseases
- All TB patients should be screened for diabetes and vice versa
- TB Treatment regimen and duration are same for both patients with or without Diabetes

Emphasizing early detection of TB and diabetics; which can improve the care and control of both the diseases and all TB patients should be screened for diabetes and vice versa. TB treatment regimens and duration are same for both patients with or without diabetes.

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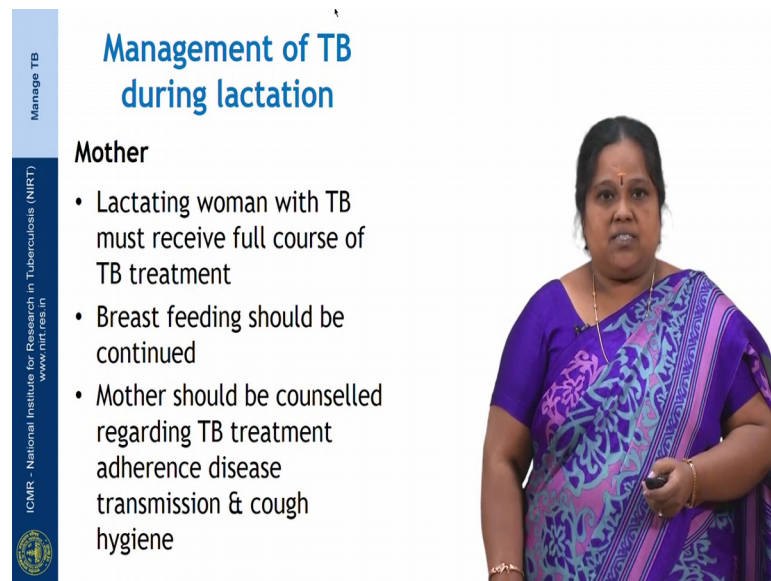
The slide is titled "TB and Pregnancy". It features a vertical sidebar on the left with the text "Manage TB" at the top, "ICMR - National Institute for Research in Tuberculosis (NIRT)" in the middle, and "www.nirt.res.in" at the bottom. The main content area contains three bullet points: "Pregnant women with chest symptoms should be screened and investigated for TB during antenatal visits", "Successful TB treatment is important for successful outcome of pregnancy", and "All first line anti-TB drugs are safe in pregnancy except streptomycin". A fourth bullet point states "All women of child bearing age should be advised to avoid pregnancy during TB treatment". A woman in a purple saree is standing on the right side of the slide, holding a small object in her hand.

- Pregnant women with chest symptoms should be screened and investigated for TB during antenatal visits
- Successful TB treatment is important for successful outcome of pregnancy
- All first line anti-TB drugs are safe in pregnancy except streptomycin
- All women of child bearing age should be advised to avoid pregnancy during TB treatment

TOG 2016

Another co-morbidity with TB is pregnancy; pregnant women with chest symptoms should be screened and investigated for TB during antenatal visits. Successful TB treatment is important for successful outcome of pregnancy, all first line drugs are safe in pregnancy except streptomycin all women of childbearing age should be advised to avoid pregnancy during TB treatment.

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The slide is titled "Management of TB during lactation" and is presented by a woman in a purple sari. The slide content is as follows:

Management of TB during lactation

Mother

- Lactating woman with TB must receive full course of TB treatment
- Breast feeding should be continued
- Mother should be counselled regarding TB treatment adherence disease transmission & cough hygiene

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The management of TB during lactation with respect to mother includes a lactating women with TB must receive full course of TB treatment; breastfeeding should be continued and mother should be counselled regarding the TB treatment adherence disease transmission and cough hygiene.

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Management of TB during lactation

Baby

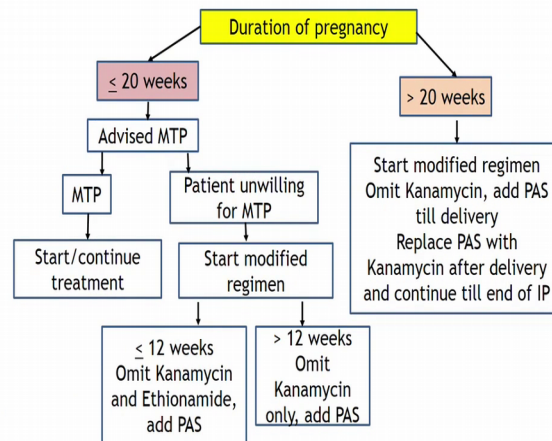
- After ruling out active TB, baby should be given Isoniazid preventive therapy for 6 months, followed by BCG vaccination
- Pyridoxine (5mg/kg) to be given to breast fed baby if the mother is on Isoniazid



The management of TB during lactation with respect to baby includes; after ruling out active TB in baby, baby should be given isoniazid preventive therapy for 6 months followed by BCG vaccination and pyridoxine should be supplemented with 5 mg per kg body weight or to the breastfed baby if the mother is on isoniazid.

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Management of drug resistant TB in pregnancy




So, the management of drug resistant TB in pregnancy as I have already told all the women in childbearing age should be advised to avoid pregnancy during TB treatment, but if they become pregnant depending on the duration of pregnancy the management of drug resistant TB differs. If the pregnancy is less than 20 weeks it is advised a medical

termination of pregnancy to the mother. If the patient is willing for medical termination of pregnancy we can start or continue their existing treatment.

If the patient is unwilling for MTP we have to start a modified regimen, if the gestation week is less than 12 weeks we have to omit kanamycin and ethionamide and add PAS. If the gestation week is more than 12 weeks, we have to omit kanamycin only and add PAS. If the pregnancy is more than 20 weeks we have to start a modified regimen omitting kanamycin add PAS till the delivery replace the PAS with kanamycin after delivery and continue till the end of IP.

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The slide content is as follows:

Management of TB in patients with liver disorders

- Patients who are
 - Hepatitis virus carriers
 - Past h/o acute hepatitis
 - Current excessive alcohol consumption

with no clinical evidence of chronic liver disease

- ✓ TB treatment & dosage are same as normal hepatic function

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TOG 2016

Next we come to the management of feed TB in patients with liver disorders; patients who are hepatitis virus carriers, patients with a past history of acute hepatitis, patients who have current extreme of excessive alcohol consumption, but do not have clinical evidence of chronic liver disease the TB treatment and dosage are same as people with normal hepatic function.

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Management of TB in patients with liver disorders

- Patients with Unstable or advanced liver disease should be closely monitored
 - ✓ Baseline & follow up LFTs
- Lesser hepatotoxic drugs in severe liver disease
- Expert consultation



Patients with unstable or advanced liver disease should be closely monitored. So, you have to do a baseline LFT before treatment initiation and follow up LFT's are also necessary.

So, lesser hepatotoxic drugs should be given in severe liver disease patients and we always have to get an expert consultation where while managing the patients with liver disorders.

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Management of TB in liver disorders (Alanine transaminase > 3 times normal)

Regimen with	Regimen
2 hepatotoxic drugs	<ul style="list-style-type: none"> • INH, RMP & EMB for 9 months • INH, RMP, EMB & SM for 2 months followed INH & RMP for 7 months • INH, PZA & EMB for 6-9 months
1 hepatotoxic drug	<ul style="list-style-type: none"> • INH, EMB & SM for 2 months followed by INH & EMB for 10 months
No hepatotoxic drug	- SM, EMB & FQ for 18-24 months


Pyrazinamide, Ethionamide and PAS are potentially hepatotoxic drugs

Management of TB in liver disorder patients who have alanine transaminase more than 3 times normal the following regimen is suggested. So, if we use a 2 hepatotoxic drugs in

the regimen, then the treatment would be INH rifampicin and ethambutol for 9 months or isoniazid, rifampicin, ethambutol and streptomycin for 2 months followed by INH and rifampicin for 7 months. Alternatively an INH pyrazinamide and ethambutol for 6 to 9 month is also recommended.

If we use an 1 hepatotoxic drug in the regimen then the treatment would be INH, ethambutol and streptomycin for 2 months; followed by INH and ethambutol for 10 months. If we have to use a regimen without any hepatotoxic drugs then is streptomycin, ethambutol and fluoroquinolone for 18 to 24 months is recommended. So, pyrazinamide, ethambutol and PAS are potentially hepatotoxic drugs.

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Management of TB in patients with renal disorders - 1st line anti-TB drugs

- Management of TB in Renal disorder patients should be done with Nephrology consultation
 - INH & Rifampicin does not require any modifications
 - Pyrazinamide: 25-35 mg/kg BW **thrice weekly**
 - Ethambutol: 15-25mg/kg BW **thrice weekly**
 - Streptomycin to be avoided in renal failure (If necessary, 15mg/kg **twice or thrice weekly**)

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So, management of TB in patient with renal disorders; if the patients on first line anti-TB drugs patient should be done the treatment management should be done with the consultation of nephrologist.

So, INH and rifampicin does not require any modifications, while tyrosine amide should be given 25 to 35 mg per kg bodyweight thrice weekly, ethambutol 15 to 25 mg per kg bodyweight thrice weekly, streptomycin to be avoided in renal failure if necessary we can give a 15 mg per kg bodyweight twice or thrice weekly.

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Management of TB in patients with renal disorders - 1st line anti-TB drugs

- Other precautions:
 - ✓ Pyridoxine Supplementation along with INH
 - ✓ Drug interactions between Rifampicin & immunosuppressive agents in post renal transplant patients
 - ✓ Increase the dose of corticosteroids in patients on rifampicin



Another precautions which we have to see in the patients with renal disorders are pyridoxine supplementation should always be given with INH. We are we should be aware of the drug interactions between rifampicin and immunosuppressive drugs which are given in post renal transplant patients and we have to increase the dose of corticosteroids in patients on rifampicin.

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Management of TB in patients with renal disorders - 2nd line anti-TB drugs

- In patients with severe renal impairment Aminoglycosides should be replaced with non-nephrotoxic drugs
 - If Creatinine clearance < 30ml/mt or if patients are on Hemodialysis - Dosage of Capreomycin, Kanamycin and Amikacin - 12-15 mg /kg twice or thrice weekly



If the patients with renal failure are on second line anti-TB drugs, the patients with severe renal impairment aminoglycosides should be replaced with non nephrotoxic drugs; If the creatinine clearance is less than 30 ml per minute or if the patients are on

hemodialysis dosage of the aminoglycosides would be 15 to 20, 12 to 15 mg per kg twice or thrice weekly.


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Management of TB in patients with renal disorders - 2nd line anti-TB drugs

- In patients with mild/moderate renal dysfunction
 - ✓ Dosage or interval adjustments of EMB, PAS, Quinolones and Cycloserine
- Dose adjustment not required for
 - ✓ Prothionamide, Ethionamide, Linezolid, Clofazimine



In patients with mild or moderate renal dysfunction; dosage or interval adjustments of EMB, PAS, quinolones and cycloserine should be made. Those adjustments it is not necessary for prothionamide, ethionamide, linezolid and clofazimine.


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Management of TB in seizure disorder

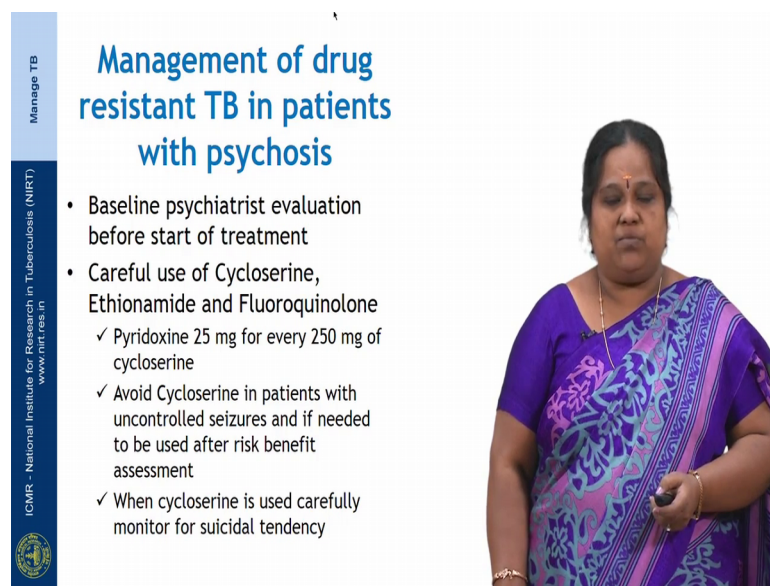
- High risk for seizure with high dose INH
- Rifampicin and Isoniazid interact with anti-epileptics
- Prophylactic dose of pyridoxine
 - Protects against the neurological side effects of isoniazid and cycloserine
 - 10 to 25 mg/day
 - for patients on Cycloserine 25mg pyridoxine for every 250 mg of Cycloserine daily
- Children: 1 to 2 mg/kg/day (10-50mg/day)



Another common problem which we have during TB management is patients with seizure disorder; patients who are on high dose INH are of high risk for seizures so rifampicin and INH are commonly interact with the anti epileptic drugs.

So, we always should give prophylactic dose of pyridoxine to protect against the neurological side effects of INH and cycloserine. So, doseage would be 10 to 25 mg per day and in children it will be 1 to 2 mg per kg per day, maximum of 10 to 15 mg per day can be given.

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The slide features a vertical blue bar on the left with the text 'Manage TB' and 'ICMR - National Institute for Research in Tuberculosis (NIRT) www.nirt.res.in'. The main title is 'Management of drug resistant TB in patients with psychosis'. The content includes a list of bullet points: 'Baseline psychiatrist evaluation before start of treatment', 'Careful use of Cycloserine, Ethionamide and Fluoroquinolone', 'Pyridoxine 25 mg for every 250 mg of cycloserine', 'Avoid Cycloserine in patients with uncontrolled seizures and if needed to be used after risk benefit assessment', and 'When cycloserine is used carefully monitor for suicidal tendency'. A woman in a purple sari is visible on the right side of the slide.

Baseline psychiatric evaluation is needed for managing pair TB in patients with psychosis. We have to carefully use cycloserine, ethionamide and fluoroquinolone and these patients should also be supplemented with pyridoxine 25 mg for every 250 mg of cycloserine and you should avoid cyclostrine in patients with uncontrolled seizures and if needed; it should be given after the risk benefit assessment.

So, we should carefully monitor for suicidal tendencies when cycloserine is administered to patients with psychosis.


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TB and nutrition

- Under nutrition is a risk factor for development of TB and progression of infection to TB disease
- Poverty and food insecurity are both causes and consequences of TB
- Low body mass index and lack of adequate weight gain during TB treatment
 - ✓ increases risk of TB relapse and death

Nutritional care & support for TB patients in India



TB and nutrition; under nutrition is in coprelavant co morbidity in TB and it impacts the TB treatment outcomes. So, under nutrition is a risk factor for development of TB and progression of infection to TB disease.

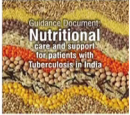
So, TB versus the nutrition under nutritions under nutrition which in turn we can say immunity and progresses the TB infection to disease. So, poverty and food insecurity are both causes and consequences of TB. Low body mass index and lack of adequate rain gear weight gain during TB treatment has to be closely monitored because it increases the risk of TB relapse and death in patients.


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TB and nutrition

- Baseline nutrition screening, assessment on-going counselling & management are integral part of TB treatment and care
- MDR TB with under nutrition
 - ✓ Provide locally available nutrient-rich or fortified supplementary foods
- Micronutrient supplementation
 - ✓ iron, folic acid, vitamins, minerals calcium

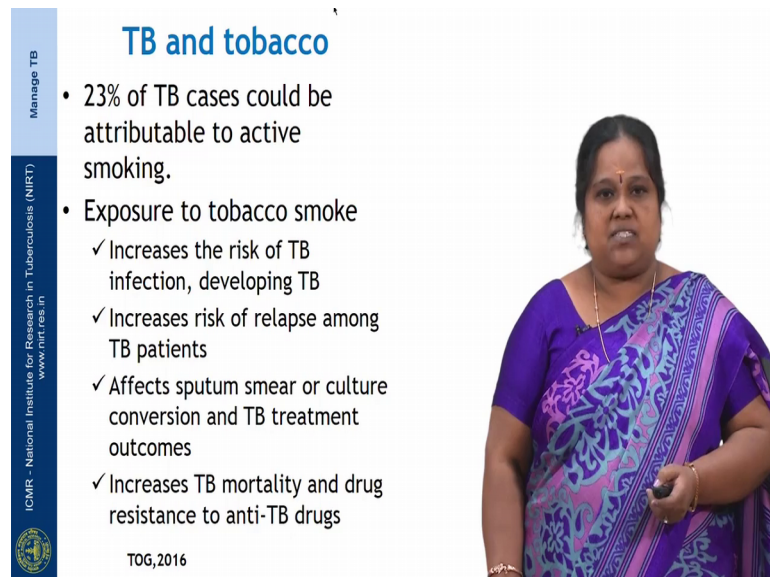




Nutritional care and support of TB were; support for TB patients in India recommends baseline nutritional screening before treatment initiation ongoing counselling and management as an integral part of TB treatment and care.

If the patient are on MDR TB treatment the these patients should be provided with locally available nutrient rich or fortified supplementary foods. Micronutrient supplementation should also be given along with the anti-TB treatments like iron, folic acid, vitamins, minerals and calcium can be supplemented as per individual patient needs.

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The slide is titled "TB and tobacco" in blue text. On the left side, there is a vertical blue bar with the text "Manage TB" at the top, "ICMR - National Institute for Research in Tuberculosis (NIRT)" in the middle, and "www.nirt.res.in" at the bottom. Below the bar is the ICMR logo. The main content of the slide is a list of bullet points:

- 23% of TB cases could be attributable to active smoking.
- Exposure to tobacco smoke
 - ✓ Increases the risk of TB infection, developing TB
 - ✓ Increases risk of relapse among TB patients
 - ✓ Affects sputum smear or culture conversion and TB treatment outcomes
 - ✓ Increases TB mortality and drug resistance to anti-TB drugs

At the bottom of the slide, it says "TOG, 2016". To the right of the slide is a photograph of a woman with dark hair, wearing a purple sari with a floral pattern, standing and looking towards the camera.

TB and tobacco; there are strong association between TB and tobacco use both active and passive tobacco use has been strongly associated with a poor treatment outcomes. So, 23 percentage of TB cases in 22 high burden countries could be attributable to active smoking.

So, exposure to TB is tobacco smoke increases the risk of TB infection. So, it develops TB, increases risk of relapse are among TB patients affects sputum smear or culture conversion and TB treatment outcomes and increases a TB mortality and drug resistant to anti-TB drugs.


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Counseling for quitting tobacco use

5 A's	
Ask	patient if he/she is a tobacco user
Advise	against continuing tobacco use and link the current condition/ ailment to continued tobacco use
Assess	readiness to quit
Assist	in making a quit plan
Arrange	follow-up by setting the next contact date

TOOL KIT FOR DELIVERING THE 5A'S AND 5R'S BRIEF TOBACCO INTERVENTIONS TO TB PATIENTS IN PRIMARY CARE



So, WHO come down with a toolkit to advice your counselling for quitting TB tobacco use. This toolkit has given provided for the health care providers. So, it is the healthcare providers responsibility to help patients in quitting tobacco use. So, the toolkit contains 5 A's. So, which includes ask, advice, assess, assistant, arrange.

So, initially first we have to ask the patient if or she is an tobacco user if they say yes; then you have to advise in a clear and strong personal manner against the continue against continuing tobacco use and link it to the current condition in ailment to continue tobacco us.

And if the patient is willing to quit the tobacco we have to willing to quit the tobacco usage, we have to assess the readiness of quitting and we have to assess them in making and making a quit plan and we have to arrange for a follow up by setting the next contact date and we can refer them to a de addiction centre.

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The slide is titled "Brief advice for quitting tobacco use". On the left, a vertical blue bar contains the text "Manage TB" at the top, "ICMR - National Institute for Research in Tuberculosis (NIRT)" in the middle, and "www.nirt.res.in" at the bottom. A central yellow box labeled "5 R's" has five arrows pointing to five colored boxes: "Relevance of quitting" (pink), "Risks of continuing" (green), "Rewards of quitting" (purple), "Roadblocks to quitting" (light blue), and "Repeat at each visit" (orange). To the right of the diagram is a photograph of a woman wearing a purple sari with a floral pattern, standing and looking towards the camera.

In patients who are non-willing to quit tobacco use 5 R's have been recommended.

So, first we have to tell them the relevance of quitting and how it can bring a change in patient's behaviour environment and in personality. If the patients are not willing to quit tobacco so, more emphasis should be given on risk of continuing the tobacco use and what all the rewards if they get by quitting the tobacco use.

If the patient is willing to quit, but he feels that he is unable to do it because of any other reasons so we have to identify the roadblocks which he faces regarding to the quitting of tobacco use and help him out to come out of his roadblocks. And we have to repeat the same advice every time the patient visits the clinic.

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TB and alcohol use

- Strong association between heavy alcohol use/ Alcohol use disorders and TB
 - ✓ Relative risk 2.94 - systematic review
- Alcohol causes
 - ✓ Higher rate of lost to treatment
 - ✓ Higher rate of re-infection
 - ✓ Altered drug pharmacokinetics
 - ✓ Development of drug resistance

BMC Public Health 2009, 9:450



Strong association between the heavy alcohol use; alcohol use disorders and TB treatment outcomes have been quoted in their systematic reviews with a relative risk of 2.94. So, alcohol causes higher rate of loss to treatment, higher rate of re-infection, altered drug pharmacokinetics.

So, the alcohol interferes the absorption of the drugs and increases the metabolites or metabolism of the oral anti-TB drugs so causing a decrease in the C max and the half life of the anti-TB drugs. So, development of drug resistance is also been associated with alcohol use.

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TB and alcohol use

- Baseline evaluation for alcohol intake prior to TB treatment initiation
- Periodic counseling improves treatment adherence and favorable treatment outcomes
- Interventions could include
 - ✓ Individual / group session counseling
 - ✓ Audio-visual aids
- Involvement of family members

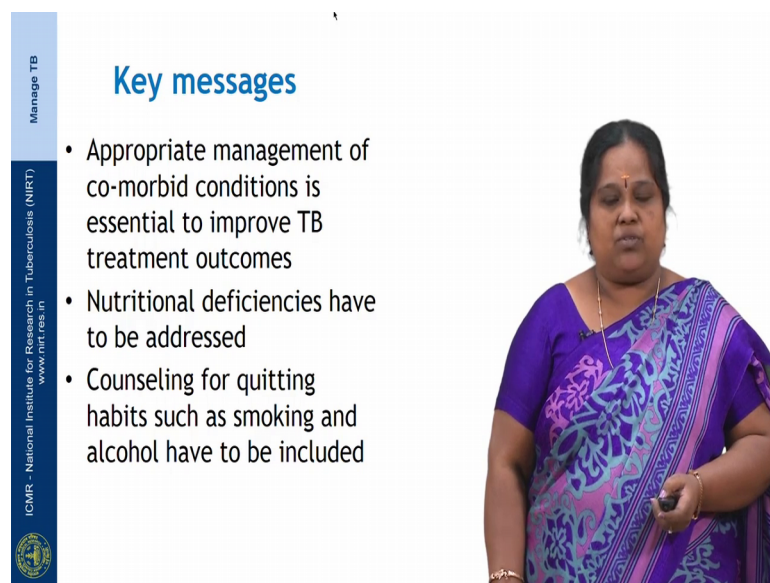
PLoS ONE 2011; 6(11): e27752,
Int J Tuberc Lung Dis. 2017; 1;21(8):947-952



So, before shutting the patient on anti-TB treatment a baseline evaluation for alcohol intake should be done. So, periodic counselling improves the treatment adherence in favourable treatment outcomes.

So, interventions could include individual counselling or group session counselling, audio visual aids can also be used for training the patient on alcohol quitting. So, involvement of family members is one of an important component in the counselling of alcohol quitting.

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The slide features a vertical blue bar on the left with the text 'Manage TB' at the top, 'ICMR - National Institute for Research in Tuberculosis (NIRT)' in the middle, and 'www.nirt.res.in' at the bottom. The main content area has the title 'Key messages' in blue. To the right of the text is a photograph of a woman in a purple sari with a floral pattern, standing and looking towards the camera.

- Appropriate management of co-morbid conditions is essential to improve TB treatment outcomes
- Nutritional deficiencies have to be addressed
- Counseling for quitting habits such as smoking and alcohol have to be included

So, the key messages on the TB management in special situations are appropriate management of co-morbid conditions is essential to improve TB treatment outcomes. Nutritional deficiencies have to be addressed, counselling for quitting habits like smoking and alcohol have to be included in the program.

Thank you.