Epidemiology of respiratory infections- Tuberculosis-I

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Tuberculosis

- Infectious disease caused by M.Tuberculosis
- Primarily causes pulmonary tuberculosis
- Can also affect intestines, meninges, bones and joints, lymph glands, skin and other tissues of the body
- Usually chronic in nature
- Also affects cattle called bovine tuberculosis

Problem statement- world

- worldwide public health problem
- Why?
- causative organism discovered more than 100 years ago
- highly effective drugs and vaccine available
- Preventable and curable disease
- Non specific determinants of disease
- Improvement in standard of living, quality of life
- Application of available technological knowledge
- health resources

Problem statement- world

- one third of global population is infected asymptomatically
- 5-10% develop clinical disease
- Most new cases and deaths in developing countries
- Annual risk of infection- 0.5-2%
- Infectious case can infect 10-15 persons each year
- Global prevalence 128 cases per 1,00,000 population
- 5.7 million cases notified through DOTS in 2010.
- MDR TB 6,50,000 cases
- Only 16% on treatment
- 10% of them are extensively drug resistant.

Problem statement- world

- death 2010- 1.4 million
- Rate fallen by 40% since 1990
- 87% successfully treated 2009
- 10% of total TB load in children
- 1million cases every year
- More than 1,00,000 deaths due to meningitis and disseminated infection.
- Social associations- poverty, economic recession, malnutrition, overcrowding, indoor air pollution, tobacco, alcohol abuse, diabetes, increased human migration, lethal combination with HIV.

Problem statement- world

- DOTS- central to public health approach
- STOP TB STRATEGY
- DOTS coverage- percentage of national population living in areas where health services have adopted DOTS
- Target- cure rate- 85%; case detection rate- 70%
- Advantages of DOTS- accuracy of diagnosis more than doubled
- Treatment success rate up to 95%
- Reduces incidence and prevalence.
- Improves quality of health care and removes stigma
- Prevents treatment failure and emergence of MDR TB
- Helps alleviate poverty, lends credibility.

Problem statement- India

- highest TB burden country
- 1/4th global incidence of TB cases in 2010.
- July 2011- prevalence and incidence of all forms were 256 and 185 cases per 1,00,000 respectively.
- National annual rate of infection is 1.5%
- Incidence of new smear positive cases is 75 per lac population
- Prevalence is 3 million cases17.6% of all deaths due to communicable disease are because of TB
- 3.5% of all cases of death are due to TB
- Premature deaths account for loss of DALYs.

Economic and social burden of disease

• primarily affects most productive years of life

•2/3 rd of cases are males

•TB kills more no. of women in reproductive age than all causes of maternal mortality together.

•1/3 rd of female infertility

•Mainly a disease of poor

•Migrant labourers, slum dwellers, residents of backward areas and tribal pockets, poor living conditions, malnutrition, shanty housing, overcrowding

•HIV increases person's susceptibility to TB

•TB is earliest opportunistic disease in HIV infected.

Economic and social burden of disease

• HIV is most potent risk factor for progression of TB infection to disease.

•6% of TB patients are HIV positive.

•2.1% new patients and 13-17% of retreatment cases have MDR TB.

•Death rate is declining

•Disease declining in younger age groups

Epidemiological indices

- to measure problem in community.
- **Prevalence of infection-** percent of individuals who show positive reaction to standard tuberculin test. Indicates cumulative experience of population to recent and remote infection with Myco. tuberculosis.
- Most of the vaccinees become positive reactors to tuberculin test
- **Incidence of infection-** annual infection rate- those who are newly infected of preceding survey during the course of 1 year
- Indicates attacking force of TB in a community

Epidemiological indices

• every 1% of annual risk of infection correspond to 50 new cases of smear positive pul. TB per 100000 general population.

•**Prevalence of disease or case rate**- sputum positive on microscopic examination. Case load in community.

•**Incidence of new cases-** new cases confirmed by bacteriological examination per 1000 population occuring during 1 year, reveals the trend of the problem in community and impact of control measures.

•**Prevalence of suspect cases-** based on X-ray, no epidemiological significance.

Epidemiological indices

• case detection rate- no. of notification of new and relapse casein a year divided by estimated incidence of such cases.

•Prevalence of drug resistant cases- patient excreting tubercle bacilli resistant to anti-tuberculosis drugs.

•Mortality rate- no. of deaths from TB every year per 1000 or 100000 population.

Some definitions related to tuberculosis

- case-

a)Patient diagnosed with at least one sputum specimen positive for acid fast bacilli, or culture positive for M. tuberculosis, or RNTCP endorsed rapid diagnostic molecular test positive for TB.

b)A patient diagnosed clinically as a case of TB without microbiologic confirmation, and initiated on anti-tuberculosis drugs.

Some definitions related to tuberculosis

- **Sputum smear examination-** lab. Technique to screen sputum for TB, where acid fast bacilli are stained red by ZN method and then identified and counted with microscopy
- **Smear positive TB-** at least 1 initial sputum smear positive for AFB in a well functioning EQA system.
- **Smear negative-** at least 2 negative smears, but TB suggestive of symptoms and X ray abnormalities or positive culture
- **Adherence**- person takes appropriate drug regimen for required time (compliance).

Some definitions related to tuberculosis

- **new case-** patient with sputum positive pul. TB who has never had treatment for TB or has taken anti TB drug for less than 4 weeks.
- **Relapse**- patient who returns smear positive having previously been treated for TB and declared cured after the completion of treatment
- **Failure case-** a patient who was initially smear positive, who began treatment and who remained or became smear positive again at months or later during the course of treatment

Some definitions related to tuberculosis

• **return after default-** a patient who returns sputum smear positive after having left treatment for at least 2 months

•**Transfer in-** a patient recorded in another administrative area, registered and transferred into another area to continue treatment

•**Transfer out-** a patient who has been transferred to another area register and treatment results are not known.

•**Cured**- initially smear positive patient who completed treatment and had negative smear result on at least 2 occasions, 1 at treatment completion

Some definitions related to tuberculosis

- **treatment completed-** initially smear negative patient who received full course of treatment or smear positive who completed treatment with negative smear at the end of initial phase but no or only 1 negative smear during continuation and none at treatment end.
- **Cohort**- a group of patients in whom TB has been diagnosed and who were registered for treatment during a specified time period.