INTERNSHIP TRAINING

at

National Health Mission, M.P

A Study to Assess the Burden of TB Patients and Its Relation with HIV and Diabetes in Government Health Facilities in 2017, Indore District, MP

by

Vineet Kumar

Under the Guidance of

Mrs. Kirti Udayai

Post Graduate Diploma in Hospital and Health Management,

2016-18

International Institute of Health Management Research, New Delhi

INTERNSHIP TRAINING

at

National Health Mission, M.P

A Study to Assess the Burden of TB Patients and Its Relation with HIV and Diabetes in Government Health Facilities in 2017, Indore District, MP

A Report

By

Vineet Kumar

Post Graduate Diploma in Hospital and Health Management,

2016-18

International Institute of Health Management Research, New Delhi

Contents

Acknowledgement

Every successful story is a result of an effective team work, a team which comprises of a good coach and good team players I want to take this opportunity to thank each and every one who supported to make this report.

To start with, I take immense pleasure to thank **Dr. Sanjiv Kumar** (*Director-International Institute of Health Management Research, New Delhi*) and **Dr. Supten Sarbadhikari** (*Dean, International Institute of Health Management Research- Delhi*) for placing me in such an esteemed organization (NHM, M.P) to perform my dissertation and start my career with; and my mentor, **Mrs. Kirti Udayai (***Assistant Dean and Assistant Professor***)** for his timely advice and encouragement for the successful conduction of my project.

I am highly indebted to **Dr. Atul Khrate** (*STO-RNTCP, NHM, M.P*) and **Dr. Vijay Chajlani** (*DTO-RNTCP, Indore, M.P*) for providing me with this opportunity to be a part of RNTCP-Indore, M.P.

Then, I take this opportunity to thank **Mr. Ashish Shukla** (*STS*), **Mr. Bharat**, **Mr. Sailendra Pawaiya, Mrs. Prabha Bargal** *(DEO)***, etc.** office colleague of District TB Centre, Malharganj, Indore, M.P. for being a constant source of support and guidance during the period of my dissertation.

Lastly, I thank all the employees of District TB Centre, Malharganj, Indore, for being highly co-operative and for helping me in every phase.

Abbreviations

AIDS	**Acquired Immune deficiency Syndrome**
ART	**Antiretroviral Therapy**
ASHA	**Accredited Social Health Activist**
DH	**District Hospital**
DM	**Diabetes Mellitus**
DTO	**District Tuberculosis Officer**
FRU	**First Referral Unit**
GOI	**Government of India**
HIV	**Human Immunodeficiency Virus**
IEC	**Information Education Communication**
LMICs	**Low and Middle Income Countries**
MDR/RR-TB	**MultiDrug-Resistant TB/Rifampicin-Resistant (but isoniazid-susceptible) TB**
MoHFW	**Ministry of Health and Family Welfare**
NACP	**National AIDS Control Program**
NHM	**National Health Mission**
NRHM	**National Rural Health Mission**
RNTCP	**Revised National Tuberculosis Control Program**
STO	**State Tuberculosis officer**
STS	**Senior Treatment Supervisor**
TB	**Tuberculosis**
WHO	**World Health Organization**

Organisational Profile

National Health Mission (*NHM*)

The **National Rural Health Mission** (NRHM), now under **National Health Mission** is an initiative undertaken by the government of India to address the health needs of under-served rural areas. The Union Cabinet vide its decision dated 1st May 2013 has approved the launch of National Urban Health Mission (NUHM) as a Sub-mission of an over-arching National Health Mission (NHM), with National Rural Health Mission (NRHM) being the other Sub-mission of National Health Mission.

The main programmatic components include Health system strengthening in rural and urban areas, Reproductive-Maternal-Neonatal-Child and Adolescent Health (RMNCH+A) and Communicable and Non-Communicable Diseases. The NHM envisages achievement of universal access to equitable, affordable & quality healthcare services that are accountable and responsive to people's needs.

NRHM seeks to provide quality healthcare to the rural population, especially the vulnerable groups. Under the NRHM, the Empowered Action Group (EAG) States as well as North Eastern States, Jammu & Kashmir and Himachal Pradesh have been given special focus. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality.

Vision of the NHM

Attainment of Universal Access to Equitable, Affordable and Quality health care services, accountable and responsive to people's needs, with effective inter-sectoral convergent action to address the wider social determinants of health.

Core Values

- ✓ Safeguard the health of the poor, vulnerable and disadvantaged, and move towards a right based approach to health through entitlements and service guarantees.
- ✓ Strengthen public health systems as a basis for universal access and social protection against the rising costs of health care.
- ✓ Build environment of trust between people and providers of health services.
- ✓ Empower community to become active participants in the process of attainment of highest possible levels of health.
- ✓ Institutionalize transparency and accountability in all processes and mechanisms.
- ✓ Improve efficiency to optimize use of available resources.

Objectives of NHM

1. Reduce MMR to 1/1000 live births.

2. Reduce IMR to 25/1000 live births.

3. Reduce TFR to 2.1.

4. Prevention and reduction of anaemia in women aged 15–49 years.

5. Prevent and reduce mortality & morbidity from communicable, non- communicable; injuries and emerging diseases.

6. Reduce household out-of-pocket expenditure on total health care expenditure.

7. Reduce annual incidence and mortality from Tuberculosis by half.

8. Reduce prevalence of Leprosy to <1/10000 population and incidence to zero in all districts.

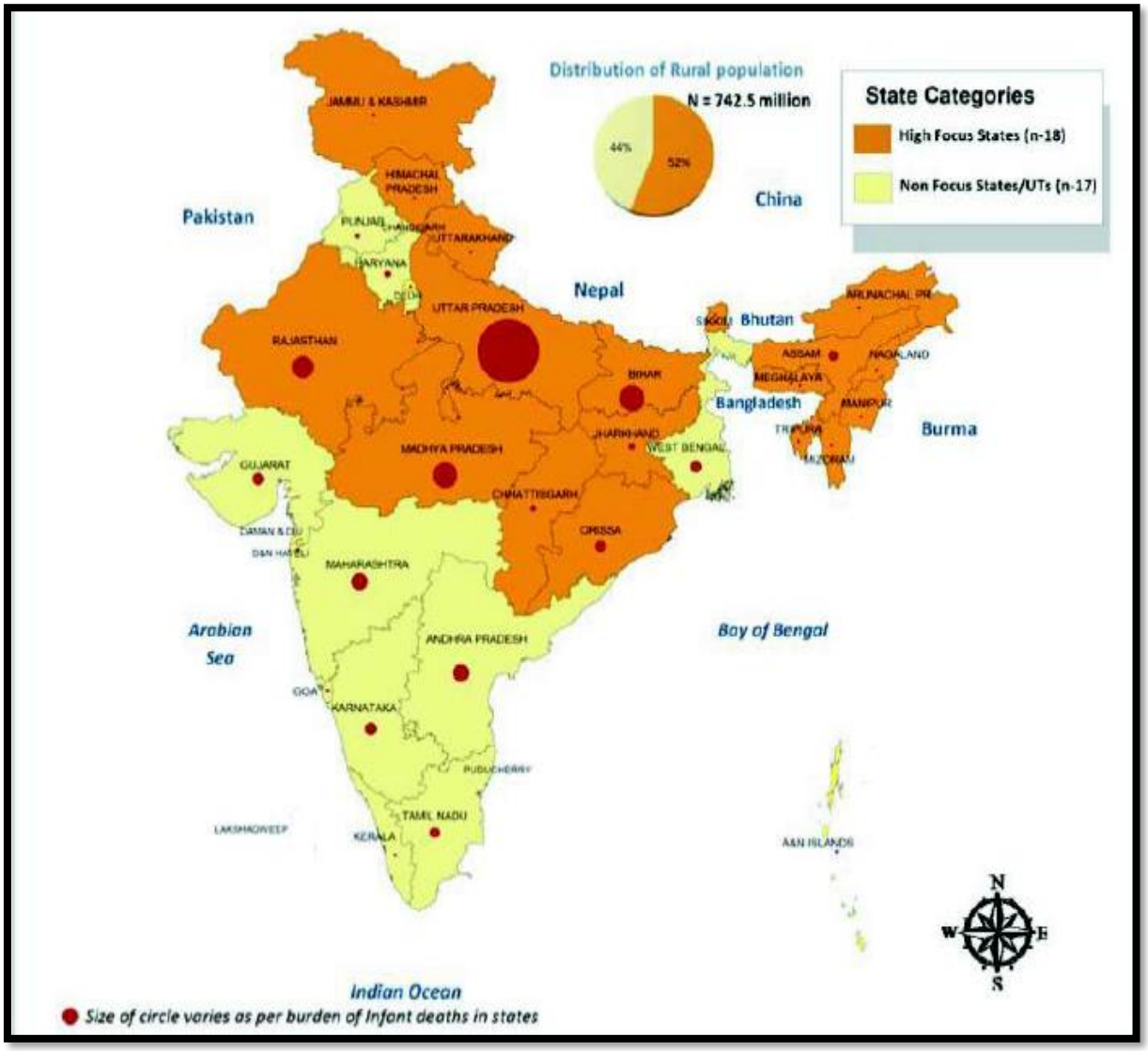
9. Annual Malaria Incidence to be <1/1000.

10. Less than 1 per cent microfilaria prevalence in all districts.

11. Kala-azar Elimination by 2015, <1 case per 10000 population in all blocks.

Please see below map for the states covered under NRHM:

Fig 1. Under the NRHM, 18 states (8 EAG, 8 North East, Jammu & Kashmir and Himachal Pradesh) have been given special focus



National Health Programmes

Janani Suraksha Yojana (JSY)

Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Rural Health Mission (NHM). It is being implemented with the objective of reducing maternal and infant mortality by promoting institutional delivery among pregnant women. The scheme is under implementation in all states and Union Territories (UTs), with a special focus on Low Performing States (LPS).

Janani Suraksha Yojana was launched in April 2005 by modifying the National Maternity Benefit Scheme (NMBS). The NMBS came into effect in August 1995 as one of the components of the National Social Assistance Programme (NSAP).When JSY was launched the financial assistance of Rs. 500/- , which was available uniformly throughout the country to BPL pregnant women under NMBS, was replaced by graded scale of assistance based on the categorization of States as well as whether beneficiary was from rural/urban area. States were classified into Low Performing States and High Performing States on the basis of institutional delivery rate i.e. states having institutional delivery 25% or less were termed as Low Performing States (LPS) and those which have institutional delivery rate more than 25% were classified as High Performing States (HPS).

RMNCH+A Strategy

The **RMNCH+A** strategy approaches include:

- ✓ Health systems strengthening (HSS) focusing on infrastructure, human resources, supply chain management, and referral transport measures.
- ✓ Prioritization of high-impact interventions for various lifecycle stages.
- ✓ Increasing effectiveness of investments by prioritizing geographical areas based on evidence.
- ✓ Integrated monitoring and accountability through good governance, use of available data sets, community involvement, and steps to address grievance.
- ✓ Broad-based collaboration and partnerships with ministries, departments, development partners, civil society, and other stakeholders.

Janani Shishu Suraksha Karyakaram (JSSK)

Government of India has launched the **Janani Shishu Suraksha Karyakaram (JSSK)** on 1st June, 2011. The scheme is to benefit pregnant women who access Government health facilities for their delivery. Moreover it will motivate those who still choose to deliver at their homes to opt for institutional deliveries. All the States and UTs have initiated implementation of the scheme. In view of the difficulty being faced by the pregnant women and parents of sick new-born along-with high out of pocket expenses incurred by them on delivery and treatment of sick- new-born, Ministry of Health and Family Welfare (MoHFW) has taken a major initiative to evolve a consensus on the part of all States to provide completely free and cashless services to pregnant women including normal deliveries and caesarean operations and sick new born (up to 30 days after birth) in Government health institutions in both rural and urban areas.

Mission Indradhanush

Mission Indradhanush was launched by the Ministry of Health and Family Welfare, Government of India on December 25, 2014. Between 2009-2013 immunizations coverage has increased from 61% to 65%, indicating only 1% increase in coverage every year. To accelerate the process of immunization by covering 5% and more children every year, Indradhanush mission has been adopted to achieve target of full coverage by 2020.

The Mission Indradhanush aims to cover all those children by 2020 who are either unvaccinated, or are partially vaccinated against vaccine preventable diseases. India's Universal Immunisation Programme (UIP) provides free vaccines against 11 life threatening diseases, to 26 million children annually. The Universal Immunization Programme provides life-saving vaccines to all children across the country free of cost to protect them against Tuberculosis, Diphtheria, Pertussis, Tetanus, Polio, Hepatitis B, Pneumonia and Meningitis due to Haemophilus Influenza type b (Hib), Measles, Rubella, Japanese Encephalitis (JE) and Rotavirus diarrhoea. (Rubella, JE and Rotavirus vaccine in selected states and districts).

Revised National Tuberculosis Control Programme

The National Tuberculosis Programme of India (NTP) was initiated in 1962 and was originally designed for domiciliary treatment, using self- administered standard drug regimens. A combined review of the programme in 1992 concluded that the NTP could not achieve its objectives of TB control and hence, on the recommendations of an expert committee, a revised strategy to control TB was pilot-tested in 1993.A full-fledged programme was started in 1997 and rapidly expanded with excellent results. This **Revised National Tuberculosis Control Programme** (RNTCP) that uses the DOTS (Directly Observed Treatment, Short-course

chemotherapy) strategy achieved country coverage on World TB Day, 24th March, 2006 with support from World Bank and other development partners.

The year 2012 witnessed innumerable activities happening towards the same. Notification of TB; case based web based recording and reporting system (NIKSHAY); Standards of TB care in India; Composite indicator for monitoring programme performance; Rapid scale up of the programmatic management of drug resistant TB services are few of the worthwhile mention in this regard. The goal of TB control Programme is to decrease mortality and morbidity due to TB and cut transmission of infection until TB ceases to be a major public health problem in India.

In 2016, the MDGs were succeeded by a new set of goals, known as the Sustainable Development Goals (SDGs). The consolidated goal on health is SDG 3. It is defined as "Ensure healthy lives and promote well-being for all at all ages", and 13 targets have been set for this goal. One of these targets, Target 3.3, explicitly mentions TB: "By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water borne diseases and other communicable diseases".

The NSP 2017-2025 builds on the success and learning's of the last NSP and encapsulates the bold and innovative steps required to eliminate TB in India by the year 2025. On the World TB day, the *TB Harega, Desh Jeetega* campaign, featuring bollywood star Amitabh Bachchan was launched nationwide by the Ministry of Health and Family Welfare, Government of India in New Delhi at an event attended by policymakers, administrators, TB survivors, officials from the Government's Central TB Division (CTD), civil society activists and members of the National Forum on TB (NFTB). The campaign features Mr. Bachchan as the face and voice of TB prevention and control. This campaign is being disseminated nationally to raise awareness on TB.

National AIDS Control Programme

The **National AIDS Control Programme (NACP)**, launched in 1992, is being implemented as a comprehensive programme for prevention and control of HIV/ AIDS in India. Over time, the focus has shifted from raising awareness to behaviour change, from a national response to a more decentralized response and to increasing involvement of NGOs and networks of People living with HIV (PLHIV).

The NACP I started in 1992 was implemented with an objective of slowing down the spread of HIV infections so as to reduce morbidity, mortality and impact of AIDS in the country.

In November 1999, the second National AIDS Control Project (NACP II) was launched to reduce the spread of HIV infection in India, and (ii) to increase India's capacity to respond to HIV/AIDS on a long-term basis.

NACP III was launched in July 2007 with the goal of Halting and Reversing the Epidemic over its five-year period.

NACP IV, launched in 2012, aims to accelerate the process of reversal and further strengthen the epidemic response in India through a cautious and well defined integration process over the next five years.

National Vector Borne Disease Control Programme

The **National Vector Borne Disease Control Programme (NVBDCP)** is an umbrella programme for prevention and control of vector borne diseases viz. Malaria, Japanese Encephalitis (JE), Dengue, Chikungunya, Kalaazar and Lymphatic Filariasis.

The States are responsible for implementation of programme, whereas the Directorate of NVBDCP, Delhi provides technical assistance, policies and assistance to the States in the form of cash & commodity, as per approved pattern.

List of Vector Borne Diseases Control Programme Legislations:

1. National Anti - Malaria programme
2. Kala - Azar Control Programme
3. National Filaria Control Programme
4. Japenese Encephilitis Control Programme
5. Dengue and Dengue Hemorrhagic fever.

Pulse Polio Programme

The **Pulse Polio** Initiative was started with an objective of achieving hundred per cent coverage under Oral Polio Vaccine. It aimed to immunize children through improved social mobilization, plan mop-up operations in areas where poliovirus has almost disappeared and maintain high level of morale among the public.

With the global initiative of eradication of polio in 1988 following World Health Assembly resolution in 1988, Pulse Polio Immunization programme was launched in India in 1995.

Children in the age group of 0-5 years administered polio drops during National and Sub-national immunization rounds (in high risk areas) every year. Around 17.4 crore children of less than five years across the country are given polio drops as part of the drive of Government of India to sustain polio eradication from the country.

The last polio case in the country was reported from Howrah district of West Bengal with date of onset 13th January 2011. Thereafter no polio case has been reported in the country. WHO on 24th February 2012 removed India from the list of countries with active endemic wild polio virus transmission.

Rashtriya Kishore Swasthya Karyakram

The **Rashtriya Kishore Swasthya Karyakram** was launched on 7th January, 2014. The key principle of this programme is adolescent participation and leadership, Equity and inclusion, Gender Equity and strategic partnerships with other sectors and stakeholders. The programme envisions enabling all adolescents in India to realize their full potential by making informed and responsible decisions related to their health and well-being and by accessing the services and support they need to do so.

To guide the implementation of this programme, MOHFW in collaboration with UNFPA has developed a National Adolescent Health Strategy. It realigns the existing clinic-based curative approach to focus on a more holistic model based on a continuum of care for adolescent health and developmental needs.

Rashtriya Bal Swasthya Karyakram (RBSK)

The Ministry of Health & Family Welfare, Government of India, under the National Health Mission launched the Rashtriya Bal Swasthya Karyakram (RBSK), an innovative and ambitious initiative, which envisages Child Health Screening and Early Intervention Services, a systemic approach of early identification and link to care, support and treatment. This programme subsumes the existing school health programme.

Child Health Screening and Early Intervention Services basically refer to early detection and management of a set of 30 health conditions prevalent in children less than 18 years of age. These conditions are broadly Defects at birth, Diseases in children, Deficiency conditions and Developmental delays including Disabilities - 4D's.

The RBSK programme corresponds to the Reproductive, Maternal, New-born, Child Health and Adolescent Health strategy (RMNCH+A), Incheon Strategy to "Make the Right Real" for Persons with Disabilities in Asia and the Pacific, and Child Survival and Development – A Call to Action summit held in Mahabalipuram, Tamil Nadu in 2013. It aims at providing continuum of care from birth to throughout childhood period. It is a step towards 'Health for All' or 'Universal Health Care' wherein children would get free assured services under NHM. The task is gigantic but quite possible, through the systematic approach that RBSK envisages. Implemented in right earnest, it would yield rich dividends in protecting and promoting the health of our children.

State Profile

Madhya Pradesh is the 2nd largest state in the republic of India, with nearly 6% of the country's population & stands at 25th position in the level of literacy. The density of population is 196, with 22.27% of tribal population. The state is characterized by geographical, social and cultural variations. The state is among the high focus states of the country, because of poor Human development index, literacy, infrastructure facilities, availability of health manpower, and health outcomes. The majority of tribal communities continue to be vulnerable even today in comparison to the general population and this is reflected in the socio-economic realities and problems of these groups such as land alienation, indebtedness, deprivation of forest rights, which is further compounded by low literacy and high school drop-out rates and of extreme poverty.

State's Mission

All people living in the state of Madhya Pradesh will have the knowledge and skills required to keep themselves healthy, and have equity in access to effective and affordable health care, as close to the family as possible, that enhances their quality of life , and enables them to lead a healthy productive life'. Thus, it may be observed that the State's vision has primarily two components, namely empowering the people living in the State with knowledge and skills required to keep them healthy and equity in access to effective and affordable health care. The State of Madhya Pradesh also subscribes to the vision adopted by the National Rural Health Mission. Consequently, the adapted vision components to be pursued by the State are presented in the below: - Equip people with knowledge and skills required to keep themselves healthy. Provide effective healthcare to rural population throughout the State with special focus on worst performing districts, which have weak public health indicators and/or weak infrastructure. These districts will receive special focus. These are: Dindori, Damoh, Sidhi, Badwani,

Anuppur, Chhindwara, Rewa, Betul, Raisen, Seoni, Chhatarpur, Morena and Sheopur. Raise level of public spending on health from 0.89% GDP to 2-3% of GDP, with improved arrangement for community financing and risk pooling. Undertake architectural correction of the health system to enable it to effectively handle increased allocations and promote policies that strengthen public health management and service delivery in the State. Revitalize local health traditions and mainstream AYUSH into the public health system. Effective integration of health concerns through decentralized management at district, with determinants of health like sanitation and hygiene, nutrition, safe drinking water, gender and social concerns. Address inter-district disparities. Pursue time bound goals and publish report to the people of the state on progress. Improve access to rural people, especially poor women and children to equitable, affordable, accountable and effective primary health care.

PROJECT REPORT

A Study to Assess the Burden of TB Patients and Its Relation with HIV and Diabetes in Government Health Facilities in 2017, Indore District, MP

Background

Tuberculosis is ranked 9 among leading causes of deaths worldwide and leading cause of death from a single infectious agent, ranking above HIV/AIDS [1]. In 2015 WHO released End TB Strategy with a target to achieve 90% reduction in TB deaths and 80% reduction in TB incidence by 2030.

Ttuberculosis (TB) is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It typically affects the lungs (pulmonary TB) but can also affect other sites (extra-pulmonary TB). It spreads through the air by a person suffering from TB, for example by coughing. Overall, a relatively small proportion (5–15%) of the estimated 1.7 billion people infected with M. tuberculosis will develop TB disease during their lifetime. And a single sputum positive patient can infect 10 to 15 people in a year. However, the probability of developing TB disease is much higher among people infected with HIV, and also higher among people affected by risk factors such as under-nutrition, diabetes, smoking and alcohol consumption. Among various challenging conditions Diabetes Mellitus (DM) is emerging out to be one of the leading factors after HIV/AIDS.

In 2016, 6.3 million new cases were reported globally with a treatment success rate of 83%. Most of cases (45%) were reported from south east region. India (21%) reported maximum number of cases and had gap of about 25% between reported cases and incidence of TB.

With political commitment to end TB by 2025 funds were almost doubled to US$ 525 million by India in 2017. Revised National Tuberculosis Control Programme (RNTCP) using the DOTS (Directly Observed Treatment, Short-course chemotherapy) strategy achieved country wide coverage and between 1997 to 2015, more than 19 million patients were initiated on treatment and more than 3.5 million additional lives saved.

Recently in 2018, National AIDS Control Programme and RNTCP have developed a "National framework of joint TB/HIV Collaborative activities". The Government is proactively engaging with private practitioners, number of private organizations, NGOs, Professional bodies like Indian Medical Association, to enhance notification of TB cases. Central TB Division, in collaboration with National Informatics Centre, has developed a case-based web-based platform- 'Nikshay' in 2012, which is now been scaled up nationally. The Standards for TB Care in India (STCI) have been published jointly by RNTCP and World Health Organization in 2014, which lays down uniform standards for TB care for all stakeholders in the country.

The National Strategic Plan is aiming to achieve elimination of TB, by 2025. During plan period, targets are

1. 80% reduction in TB incidence (reduction from 211 per lakh to 43 per lakh)
2. 90% reduction in TB mortality (reduction from 32 per lakh to 3 per lakh)
3. 0% patient having catastrophic expenditure due to TB

The requirements for moving towards TB elimination have been integrated into the four strategic pillars of "Detect – Treat – Prevent – Build" (DTPB).

	How do we do it?
Detect	
Find all DSTB and DRTB cases with an emphasis on reaching TB patients seeking care from private providers and undiagnosed TB in high-risk populations	Scale-up free, high sensitivity diagnostic tests and algorithms Scale-up effective private provider engagement approaches Universal testing for drug-resistant TB Systematic screening of high-risk populations
Treat	
Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care with patient	Prevent the loss of TB cases in the cascade of care with support systems Free TB drugs for all TB cases Universal daily regimen for TB cases and rapid scale-up of short-course regimens for drug-resistant TB and DST guided
Friendly systems and social support	Treatment approaches Patient-friendly adherence monitoring and social support to sustain TB treatment Elimination of catastrophic costs by linkages of eligible TB patients with social welfare schemes including nutritional support
Prevent	
Prevent the emergence of TB in susceptible populations	Scale-up airborne infection control measures at health-care facilities Treatment for LTBI in contacts of bacteriologically-confirmed cases Address social determinants of TB through intersectoral approach
Build	
Build and strengthen enabling policies, empowered institutions, and human resources with enhanced capacities	Translate high-level political commitment to action through supportive policy and institutional structures: National TB elimination board with 4 divisions instead of the current administrative set up at the national level-TB Elimination efforts to be implemented in a "Mission mode" National TB policy and act Restructure RNTCP management structure and institutional arrangement: HR reforms to include unified state-level contractual supervisory cadre (merger of STS/STLS) and dedicated staff for TB surveillance network in the country Build supportive structures for surveillance, research and innovations, and a cafeteria approach of interventions based on local epidemiological situation Reforming STDCs and expanding the role of the Medical Colleges to include surveillance and as COEs Redefining the role of National institutes (NTI, NRTI, to encompass the burgeoning need for evidence to support policy advice Scale-up technical assistance at national and state levels Align and harmonize partners activities with program needs to prevent duplication

RNTCP: Revised National Tuberculosis Control Programme, STDC: State TB Training and Demonstration Centres, COE: Centers of excellence, NRTI: Nucleoside reverse transcriptase inhibitors, LTBI: Latent TB infection, TP: Tuberculosis, DST: Drug susceptibility testing, NTI: National Tuberculosis Institute, HR: Human Resources

The State of Madhya Pradesh from 31 December 2004 was covered under RNTCP to provide services as per RNTCP guidelines from Central TB Division, Govt. of India, New Delhi. District TB centre were developed in every district along with158 "Tuberculosis Units (TUs) and 756 Designated Microscopy Centres (DMCs) for effective management of RNTCP. More than 3000 Medical Officers, 1000 laboratory technicians, 17000 health care workers and other community volunteers have been trained. The Designated Microscopy Centres have been upgraded, established and fitted with binocular microscopes since the inception of the RNTCP to provide easy and universal access to diagnosis and treatment facilities for suspected Tuberculosis patients. About fourteen thousand treatment observation points have been established to facilitate directly observed treatment nearest to the patients. Publicity and IEC of the programme providing treatment for tuberculosis patients has been taken to grass root level to apprise the community of the facilities under RNTCP.

TB-HIV collaborative activities are being implemented in collaboration with (National AIDS Control Programme) to provide TB treatment and care and support for TB-HIV co-infected patients. In Madhya Pradesh the Intensified TB-HIV package was implemented from October 2011.

Indore is a city in Madhya Pradesh which is densely populated major city in the central province. The Indore Metropolitan Area's population is the state's largest, with 3.2 million people living there. It is the 9^{th} largest city in India and 76^{th} largest city in the world.

Indore home to 51 public health institutions and many private hospitals, nursing homes and polyclinics including MY Hospital, Bombay Hospital, SAIMS, Choithram Hospital, CHL Hospital, Medanta, Apollo, Vasan, Centre for Sight and Navchetna Rehabilitation and Dedication centre. The Programmatic Management for Drug Resistant TB for quality diagnosis and treatment of drug resistant TB cases were initiated in 2007, the programme has extended

drug susceptibility testing to all smear positive retreatment cases on diagnosis, and all cases on first line TB treatment that are smear-positive on any follow-up.

In Madhya Pradesh, diagnostic services for Drug Resistant TB to first Line drugs by Culture and Drug Susceptibility Testing is available at Bhopal, Jabalpur and Indore using Solid and Rapid diagnostics (Line Probe Assay- LPA). All the 50 districts in the state have rolled out Programmatic Management of Drug Resistant TB Cases (PMDT services) free of cost to the confirmed Drug Resistant TB cases. At present there are three functional DR-TB Centres namely at TB Hospital Id Gah Hills Bhopal, MR TB hospital Indore & R D Gardi Medical college Ujjain. They provide services of pre-treatment evaluation, initiation of treatment with Category IV drugs & management of the adverse drug reaction for the DR TB patients.

Around 3.6 million TB cases are estimated to be missing every year [Raviglione M et al 2016] and various predisposing factor like malnutrition and immunocompromised condition such as AIDS are responsible for new cases of TB [Pal R et al 2016]. Overall relative risk of developing smear positive TB is 1.4 times higher in males than in females and 15-34 age group had maximum prevalence of TB [P Raj et al, 2011]. As per findings of bhatt (2009) tribal population of Madhya Pradesh had same situation as non-tribal community with prevalence increasing with age. [Bhat 2009].

Diabetes is also an important co-morbid feature to be sought in patients with TB. Diabetes has long been known to be a risk factor for active TB and reactivation of latent TB. It is also associated with worse TB treatment outcomes. Drug–drug interactions can further complicate the picture, leading to a reduction in the effectiveness of both TB and diabetes treatments, and potential worsening of drug side effects (Aggarwal & Gupta, 2017).

The Collaborative Framework for care and control of TB and diabetes, has already sparked actions on several fronts. It has stimulated pilot projects, national policy dialogue, and new research. The World Health Assembly endorsed WHO's new End TB Strategy which incorporates all essential elements of TB and diabetes collaborative activities. The WHO Non-Communicable Diseases Global Action Plan 2013–2020 aims to reduce the impact of diabetes. Ending TB and Diabetes will require a joint response to ensure that all people with TB and those with diabetes have access to much-needed care on both fronts.

Globally, the; by 2020, these figures need to improve to 4–5% per year and 10%, respectively, to reach the first (2020) milestones of the End TB Strategy. Most deaths from TB could be prevented with early diagnosis and appropriate treatment. Millions of people are diagnosed and successfully treated for TB each year, averting millions of deaths (53 million 2000–2016), but there are still large gaps in detection and treatment.

Though the available data suggest that the TB epidemic may be on the decline, TB mortality rate is falling at about 3% per year, TB incidence is falling at about 2% per year [WHO], India continues to be the highest TB burden country in the world in terms of the absolute numbers of incidence cases each year. Mortality due to TB is the third leading cause of years of life lost (YLLs) lost, in the country. Data from the 7 subnational prevalence surveys, sub national and district level prevalence of infection surveys and analysis of programme notification data on TB, MDR TB and TB HIV reveals that the country has varied epidemiology from very high TB prevalence to very low TB prevalence, high and low TB/HIV coinfection and DR-TB depending on state/regions.

Rationale

Most of the global increase in notifications of new TB cases since 2013 is explained by a 37% increase in India 2013–2016. Further an alarming increase in infection due to the human immunodeficiency virus (HIV) has accelerated this situation and it is believed that, as of now, about 3.5 million people in India are infected with HIV. There is a grave concern in India regarding the increase in HIV associated TB and the emergence of MDR-TB in both magnitude and severity of TB epidemic. People with a weak immune system, as a result of chronic diseases such as diabetes, are at a higher risk of progressing from latent to active tuberculosis. Diabetes triples a person's risk of developing TB [WHO]. About 15% of TB cases globally may be linked to diabetes. The likelihood that a person with TB will die or relapse is significantly higher if the person also has diabetes. A large proportion of people with diabetes as well as TB are not diagnosed, or are diagnosed too late".

Study attempts to estimate burden of TB in city of Indore Madhya Pradesh and explore relationship between TB, HIV and Diabetes.

Research Question

- What is burden of TB cases in Indore?
- What is Co-Morbidity of TB and HIV?

Objectives

- To assess burden of TB cases in Indore
- To estimate burden of MDR/RR-TB cases
- To explore relation of TB, HIV & diabetes

Methodology

Study Type: Descriptive Cross-sectional study

Duration of Study: - 16st April to 10th May

Data Collection:

Study is based on secondary data extracted from Nikshay Portal. All reported TB cases in Public Health facilities in 2017 were included in study. During the year new reporting format was used from June 2017 which had some additional reporting data points. New data points were analysed for period of last 6 months (June- December 2017). Common data points were analysed for whole year of 2017. Data analysis was done using Microsoft excel and SPSS. The collected data was compiled and analysed using techniques of descriptive statistics through Microsoft Office and SPSS version 23. Bar Graph, Pie Charts frequency tables and cross tabs were used to represent the findings of this study, as and when required.

Results and Discussion

Burden of TB in Indore

During year 2017 a Total 6630 cases of TB were reported in public health facilities of Indore. Around 40% cases were Microbiologically confirmed as TB cases and rest were clinically Diagnosed (47%). 13- 24 and 25-40 age group reported maximum number of TB cases (59%) consistent with findings of P Raj(2011).

Age_Cat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<=12	1031	15.6	15.6	15.6
	13-24	1830	27.6	27.6	43.2
	25-40	2109	31.8	31.8	75.0
	>40	1660	25.0	25.0	100.0
	Total	6630	100.0	100.0	

Table 1: Age category

Incidence of TB and was higher in Males than females which is in accordance with P Raj (2011) finding that males have relative risk of 1.4 than females to develop TB.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	2946	44.4	44.4	44.4
	M	3683	55.6	55.6	100.0
	T	1	.0	.0	100.0
	Total	6630	100.0	100.0	

Table 2: Gender frequency

Indore total has 7 TB reporting units out of which Aranya (29%) has maximum burden of TB among entire city of Indore. 63% TB patients were reported from three units Aranya, Indore DTC & MRTB Hospital out of seven TB units

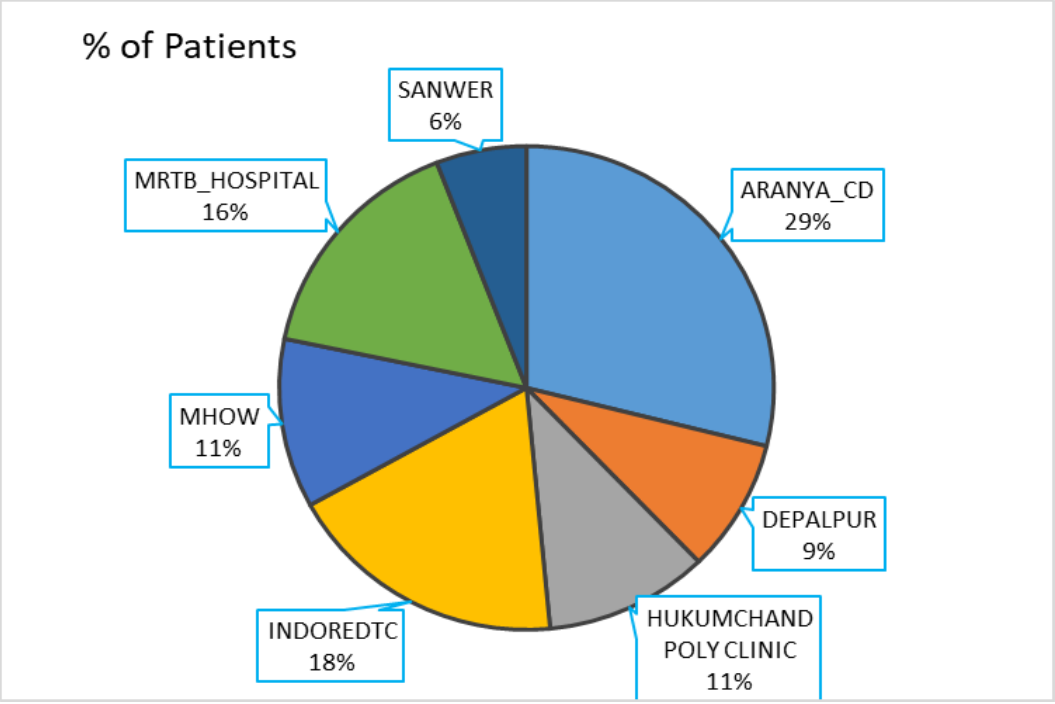


Figure 1: Burden of TB Unit Wise

When data was further segregated into unit wise into DMC, Aranya DMC under Aranya reporting unit had most burden of TB. It was noted as shown in figure below that Aranya DMC has unusually high number of TB cases reported. Possible reasons can be over reporting and further research/ intervention needs to be done to curb prevalence of TB in the area of Aranya DMC.

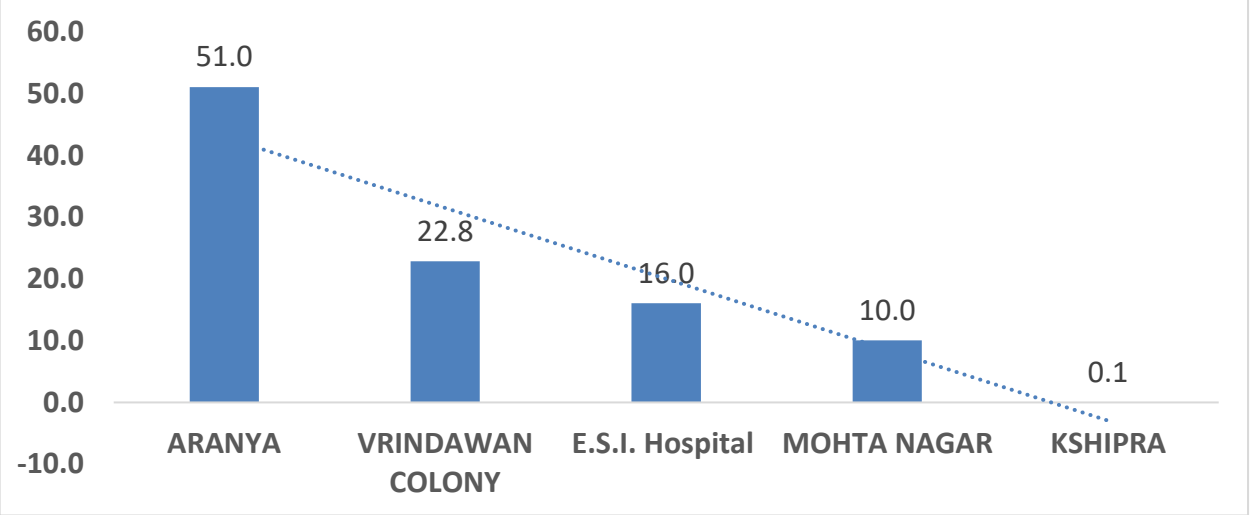


Figure 2: Burden of TB on each DMC of Aranya TB Unit

Out of total cases of Tuberculosis reported in last 6 months of 2017, 47% cases were clinically diagnosed and 40% were microbiologically confirmed. In aranya reporting unit 56% cases were clinically diagnosed and 38% were microbiologically confirmed which is reverse in order form other reporting units where more cases are microbiologically confirmed.

TB_Unit * Micr_Conf Crosstabulation					
Count					
			Micr_Conf		
			Clinically diagnosed TB	Microbiologically confirmed	Total
TB_Unit	ARANYA_CD	59	572	389	1020
	DEPALPUR	14	94	107	215
	HUKUMCHAND	42	132	151	325
	INDOREDTC	47	374	218	639
	MHOW	20	124	183	327
	MRTB_HOSPI	187	194	207	588
	SANWER	19	49	80	148
Total		388	1539	1335	3262

Table 3: TB Unit- TB Confirmation

Total no of 1378 cases were detected positive for TB after microscopy test.

Microscopy Result

Res_Microscopy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1884	57.8	57.8	57.8
	Pos	1378	42.2	42.2	100.0
	Total	3262	100.0	100.0	

Table 4: Percentage of Microscopy Results

In Indore 66% of reported TB cases were of Pulmonary Tuberculosis and 21% were extra pulmonary cases. Aranya reported 23% of pulmonary cases and 6.4% extra pulmonary cases maximum in both categories and establishes the fact that this reporting unit needs immediate intervention to improve TB burden being reported. IEC / BCC activities must be strengthened in this area to reduce incidence of Tuberculosis from the area which is maximum in entire city of Indore.

Site_of_Disease

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		388	11.9	11.9	11.9
	E	698	21.4	21.4	33.3
	P	2176	66.7	66.7	100.0
	Total	3262	100.0	100.0	

Table 5: Burden of TB *E- Extra Pulmonary TB, *P- Pulmonary TB

Pat_Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		388	5.9	5.9	5.9
	New	5244	79.1	79.1	84.9
	Relapse	254	3.8	3.8	88.8
	Retreatment	489	7.4	7.4	96.2
	Transfer In	5	.1	.1	96.2
	Treatment a	233	3.5	3.5	99.7
	Treatment A	17	.3	.3	100.0
	Total	6630	100.0	100.0	

Table 6: Burden of TB via Patient Type

As evident from table above 79% cases were new in 2017 and 7% were retreatment cases. About 3.8% were reported as relapse TB cases during year 2017.

MDR/RR-TB Cases

2017 saw 8.3% of cases being detected as MDR/RR TB cases. Out of all detected as drug resistant cases only 21.1% were put on treatment regimen for drug resistant TB. This finding is consistent with finding of WHO as 1 in 5 cases are treated of drug resistant TB is treated. Cases Sensitive to Rifampicin were 6% and threaten to become drug resistant. If we see overall cases in the year that reported TB only 1.8% were being treated for Drug resistant TB.

Result_CBNAATRIF * MDR Crosstabulation

Count

		MDR			Total
			Regimen for MDR/RR TB	Regimen for XDR TB	
Result_CBNAATRIF		2987	34	2	3023
	Resistant	13	22	0	35
	Sensitive	4	0	0	4
	Sensitive	200	0	0	200
Total		3204	56	2	3262

Table 7: Cross tabulation Between CBNAATRIF Results and Regimen of MDR/RR-TB cases

Res_CBNAAT * MDR Crosstabulation

Count

	MDR			Total
		Regimen for MDR/RR TB	Regimen for XDR TB	
Res_CBNAAT	2987	34	2	3023
Detected	217	22	0	239
Total	3204	56	2	3262

Table 8: Cross tabulation Between CBNAAT Results and Regimen of MDR/RR-TB cases

Regimen					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3204	98.2	98.2	98.2
	Regimen for MDR/RR TB	56	1.7	1.7	99.9
	Regimen for XDR TB	2	.1	.1	100.0
	Total	3262	100.0	100.0	

Table 9: Regimen of MDR/RR-TB frequency

Facility wise maximum cases were treated in MRTB Hospital in Indore (81%).

TB_Unit * Regimen					
Count					
			Regimen		
			Regimen for MDR/RR TB	Regimen for XDR TB	Total
TB_Unit	ARANYA_CD	1017	3	0	1020
	DEPALPUR	214	1	0	215
	HUKUMCHAND	324	1	0	325
	INDOREDTC	635	4	0	639
	MHOW	325	2	0	327
	MRTB_HOSPI	541	45	2	588
	SANWER	148	0	0	148
Total		3204	56	2	3262

Table 10: Facility wise Regimen of MDR/RR-TB cases

Majority of drug resistant TB cases were detected in Male population.

Res_CBNAAT * Gender Crosstabulation

			Gender		
			F	M	Total
Res_CBNAAT		Count	1369	1654	3023
		% of Total	42.0%	50.7%	92.7%
	Detected	Count	97	142	239
		% of Total	3.0%	4.4%	7.3%
Total		Count	1466	1796	3262
		% of Total	44.9%	55.1%	100.0%

Table 11: Cross tabulation between Gender and CBNAAT results

13-24 age group reported maximum number of TB cases (38%) and in this category most of drug resistant cases were in females (57%). What draws attention in this finding is that TB cases are pre dominantly observed in male but drug resistant cases in the age category were of female. Out of all drug resistant cases in female population 53% were in the age group 13-24 in Indore. Further studies need to be conducted to provide more evidence on this finding.

TB with HIV Status

In the entire year of 2017 2.1% HIV cases were reported out of all TB cases reported in public health facilities. 45% HIV patient were prone to become MDR and were found to be sensitive to rifampicin.

HIV_Stat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		110	1.7	1.7	1.7
	Neg	6169	93.0	93.0	94.7
	Pos	138	2.1	2.1	96.8
	Unknown	213	3.2	3.2	100.0
	Total	6630	100.0	100.0	

Table 12: HIV status by frequency

MRTB Hospital reported maximum number of TB cases during the year (40%) followed by Aranya (23%). Together they reported 63% cases of TB with HIV. Most cases of HIV with TB were new cases (66%) that were reported by different units and 13% cases were of retreatment category.

TB with HIV – Unit Wise

HIV_Stat_Code * TB_Un_cod Crosstabulation									
Count									
		TB_Un_cod							
		ARANYA_CD	DEPALPUR	HUKUMCHAND	INDOREDTC	MHOW	MRTB_HOSPI	SANWER	Total
HIV_Stat_Code	Negative	1844	564	673	1149	722	862	355	6169
	Positive	32	12	7	12	11	56	8	138
	Unknown	20	13	15	31	12	109	13	213
Total		1896	589	695	1192	745	1027	376	6520

Table 13: Cross tabulation between HIV status and TB units

TB With HIV- Patient Type

HIV_Stat_Code * Patient Type Crosstabulation									
Count									
		TB_Treat							
			New	Relapse	Retreatment	Transfer In	Treatment after Failure	Treatment after Lost to Follow Up	Total
HIV_Stat_Code	Negative	237	5004	239	445	4	15	225	6169
	Positive	22	92	5	19	0	0	0	138
	Unknown	129	61	6	11	0	2	4	213
Total		388	5157	250	475	4	17	229	6520

Table 14: Cross Tabulation between Patient types with HIV status

TB with HIV cases that were cured were minimum with only 1 case being reported as cured of TB.

HIV with TB – Treatment Outcome

HIV_Stat_Code * Treat_Result Crosstabulation									
Count									
		Treat_Result							
			Cured	Died	Failure	Lost to Followup	Treatment Comple	Treatment Regime	Total
HIV_Stat_Code	Negative	5482	310	10	2	5	358	2	6169
	Positive	124	1	4	0	0	9	0	138
	Unknown	212	0	0	0	1	0	0	213
Total		5818	311	14	2	6	367	2	6520

Table 15: Cross tabulation between HIV status and Treatment Outcome

From Mid-Year screening of Diabetic cases was started in patient with TB. Less than 1% cases were reported as diabetic between June-December 2017. No case in city of Indore was reported to have 3 condition simultaneously i.e. TB, HIV and Diabetes.

Diabetes Status – June 2017

Status_Diabe

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2292	70.3	70.3	70.3
	Diabetic	28	.9	.9	71.1
	NonDiabetic	572	17.5	17.5	88.7
	Unknown	370	11.3	11.3	100.0
	Total	3262	100.0	100.0	

Table 16: Diabetes status in TB patients

HIV and Diabetes

HIV_Status * Status_Diabetes Crosstabulation						
Count						
			Status_Diabetes			
			Diabetic	NonDiabetic	Unknown	Total
HIV_Status	Neg	2075	27	533	359	2994
	Pos	40	0	13	2	55
	Unknown	177	1	26	9	213
Total		2292	28	572	370	3262

Table 17: Cross tabulation between HIV and Diabetes

Conclusion:

TB cases reported in city of Indore in public health facilities are unevenly distribute between different reporting units and Aranya shows maximum burden of TB cases. Intervention in area of this reporting unit must be done on priority to improve status of TB cases in city of Indore and will help curb burden of TB cases. Intervention can be done by raising awareness among people through mass education by organising workshops, seminars for adopting preventing measures to reduce the spread of TB and also about specific immunisation or vaccination of TB. Age category reporting maximum number of cases was in age group 13-40 years.

In cases of MDR-TB, newly available rapid molecular diagnostics need to be expanded at the lowest possible care level and new medicines, such as bedaquiline and delamanid, added to current regimens to improve care of drug-resistant cases and prevent them from spreading further.

TB with HIV cases were 2.1% and no cases had triple burden of disease. There should be proper isolation of immunocompromised HIV patients to avoid further complications by getting exposed to infectious agents leading to HIV associated TB.

Conflict of Interest

None

References

1. India. Central TB Division. RNTCP – National Strategic Plan For Tuberculosis Elimination 2017 To 2025. Ministry of Health. 2017 March [Cited April 2018].

2. WHO. Global TB Report 2017. WHO [Internet]. 2017 [Cited April 2018]

3. WHO. Global tuberculosis report 2017. Geneva: World Health Organization. 2017 [Cited April 2018]. Licence: CC BY-NCSA 3.0 IGO.

4. Guidelines for PMDT in India, 2017

5. India. Central TB Division. India TB Report 2018. Ministry of Health. 2018 [cited April 2018].

6. WHO. Tuberculosis & Diabetes. 2016 [Cited April 2018]. Available from: www.whoint./tb

7. Drug resistance in Tuberculosis in India. Indian J Med Res 120, October 2004, pp 377-378

8. Pandey, S., Chadha, V. K., Laxmi Narayan, R., & Arinaminpathy, N. (2017). Estimating tuberculosis incidence from primary survey data: a mathematical modeling approach. *The International Journal of Tuberculosis and Lung Disease*, *21*(4), 366–374. http://doi.org/10.5588/ijtld.16.0182

9. World Health Organization. Methods used to estimate the global burden of disease caused by TB. Geneva, Switzerland:WHO; http://www.who.int/tb/publications/global_report/gtbr14_online_technical_appendix.pdf Accessed December 2016.

10. Chadha V K, Sarin R, Narang P, at al Trends in annual risk of tuberculous infection in India. Int J Tuberc Lung Dis 2013;17: 312– 319. [PubMed]

11. Rao V G, Bhat J, Yadav R, Gopalan G P, et al. Prevalence of pulmonary tuberculosis: a baseline survey in Central India.PLOS ONE 2012; 7: e43225. [PMC free article] [PubMed].

12. Prevalence of Pulmonary Tuberculosis - A Baseline Survey In Central India Vikas G. Rao Jyothi Bhat, Rajiv Yadav, Gopi Punnathanathu Gopalan, Selvakumar Nagamiah, Manoj Kumar Bhondeley, Sharada M. Anjinappa, Jitendra Ramchandra, Vineet K. Chadha, Fraser Wares https://doi.org/10.1371/journal.pone.0043225

13. Jyothi Bhat, Vikas G Rao, Punnathanathu Gopalan Gopi, Rajiv Yadav, Nagamiah Selvakumar, Balkrishna Tiwari, Vijay Gadge, Manoj K Bhondeley, Fraser Wares; Prevalence of pulmonary tuberculosis amongst the tribal population of Madhya Pradesh, central India, International Journal of Epidemiology, Volume 38, Issue 4, 1 August 2009, Pages 1026–1032, https://doi.org/10.1093/ije/dyp222

14. Prevalence of smear-positive pulmonary tuberculosis in different ethnic groups in India: Evaluation of public health P. Raj, R. Prakash, G. Mishra, T.D. Singh, S. Poojary, N.K. Mehra, P.K. Tiwari https://doi.org/10.1016/j.puhe.2011.12.016

15. Rahul Pal, Moiz A. Ansari, Saif Hameed, and Zeeshan Fatima, “Diabetes Mellitus as Hub for Tuberculosis Infection: A Snapshot,” International Journal of Chronic Diseases, vol. 2016, Article ID 5981574, 7 pages, 2016. https://doi.org/10.1155/2016/5981574