Original Article

A study to know the reason of highest Multi Drug Resistant Tuberculosis in Mandi District of Himachal Pradesh as compared to other Districts of the Himachal Pradesh

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As per the Revised National TB Control Programme (RNTCP) report of the stateout of 11 Districts of Himachal Pradesh MANDI District has the highest incidence of MDR TB cases continuously from 2010 to 2014 as compared to other districts.Although the population of KANGRA district (1.6 Million) is much higher than the MANDI district (1.1 million), but the incidence of Multi Drug Resistance Tuberculosis (MDR TB) is higher in MANDI district as compared to KANGRA district.By the end of 2014, a total of 567 MDR TB cases were diagnosed in 11 districts of Himachal Pradesh out of which 130(23 %) MDR cases were detected only in Mandi District. The objective of this study was to know the reason of high number of MDR TB in Mandi District of Himachal Pradesh as compared to other districts of the State.

Private sector in India, has unfortunately, been a source of mismanagement of TB cases and hence of drug resistance. This includes the use of incorrect diagnostics, incorrect regimes and a lack of supervision to ensure all TB patients complete their TB treatment. The Methodology of this study adopted was to establish Designated Microscopic Centers (DMC) with different private Health Providers (ie, private hospitals, private Laboratories and in the clinic of qualified Private Practitioners) as per the guidelines of RNTCP with logistic support by District TB office. All the TB cases diagnosed by these private health providers were notified to District TB office. Strict supervision wasmade by RNTCP consultant, WHO Consultant and District TB Officer (DTO).

Results of TB cases notified from these private health providersfrom 2013 to 2015 were analyzed. It was observed that out of 3518 sputum of different TB suspects were examined in these private DMCs in Mandi District a total of532 (15 %) TB suspects were found to be positive for TB. These 532 TB patients were not given Directly Observed Treatment (DOT) instead were prescribed anti TB drugs by the Private hospitals and PPs and handed over the prescription to the patients.

Conclusion and Lessons Learned : Any District of India with high number MDR and XDR TB, it is likely that there are high number of Private health providers are treating TB cases who are not completing the full course of treatment. So those Districts of India with high number MDR / XDR TB should be line listed and extensive efforts should be made to open up DMCs and DOT center with Private health providers as per the guidelines of RNTCP.

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Key words **: RNTCP, TB, MDR TB, XDR TB, DMC, DOTS, DTO, CME.**

In 2016 WHO estimated 10.4 million new TB cases worldwide,10% of which were people living with HIV. Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat[1]. WHO estimates that there were 600 000 new cases with resistance to rifampicin - the most effective first-line drug, of which 490 000 had MDR-TB. Almost half of these cases were in India, China and the Russian Federation. Drug resistance TB can occur when the drugs used to treat TB are mismanaged (ie, People do not complete full course of TBtreatment)[2]. Private sector in India, has unfortunately, been a source of mismanagement of TB and hence of drug resistance. This includes the use of incorrect diagnostics (eg, blood tests), incorrect regimes and a lack of supervision to ensure all TB patients complete their TB treatment. As per the report

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Editor's Comment :

- **There is increasing trend of MDR Tuberculosis all over world.**
- **Nonconpliance is key factor in developing MDR Tuberculosis.**
- **Early Detection of drug resistance by CBNAAT is another crucial issue in controlling MDR tuberculosis.**
- **Significant number of patients are diagnosed and treated by Private Practitioners.**
- **Govt Sector and Private sector should work hand in hand to eliminate TB.**
- **GOI launched END TB programme to eliminate TB by 2025.**
- **RNTCP renamed as National Tuberculosis Elimination Program (NTEP) from 1st January, 2020.**
- **IMA extended cooperation to GOI and nation to reach the goal.**

of Central TB Division, Ministry of Health, Govt. of India[3], there are large gaps between the burden of MDR TB and the actual number diagnosed and treated till date. Substantial number of MDR TB patients are mis treated in the private sector leading to additional drug resistance and XDR TB. In the private sector, evidence suggests that patients are sent off with their medication without advice or support. As patients feel better within a couple ofweeks, they often stop taking the medication. After default when again the patient become sick, theygo on shopping around with Private Doctors for purchasing the TB treatment and finally end up with MDR TB. Hence completing the course is key to effective treatment.

Global fund for AIDS, TB and Malaria (GFATM) funded Indian Medical Association (IMA) through Ministry of Health, Govt. of India to implement a Public Private Mix (PPM) project in many states of India including Himachal Pradesh State to involve the Private Health Providers (ie, Private Hospitals, Private Practitioners, Private Laboratories etc.) to diagnose and treat TB patients as per the DOTstrategy. The Author was appointed as the Technical Consultant of this Project.

As per the Revised National TB Control Programme (RNTCP) report, out of 11 Districts of Himachal Pradesh Mandi District has the highest incidence of MDR TB cases continuously from the year of 2010 as compared to other districts. Although the population of KANGRA district (1.6 Million) is much higher than the Mandi district (1.1 million), but the incidence of Multi Drug Resistance Tuberculosis (MDR TB) is higher in Mandi district as compared to Kangra district.

Meterials and Methods

The objective of this study was to know the reason of high number of MDR TB in MANDI District of Himachal Pradesh as compared to other district of the StateThis study is basically aobservationalfield study involving the Private Health providers who are involved in treating TB cases in Mandi District of Himachal Pradesh. The site of study was in Mandi district of Himachal Pradesh State. The duration of this study was from 2012 to 2015.A detailed report on incidence of MDR TBwere collected from state TB office of Himachal Pradeshand was analyzed the incidence of MDR TB. By the end of 2014, a total of 567 MDR TB cases were diagnosed in 11 districts of Himachal Pradesh. Although the population of Kangra District (1.6 Million) is much higher than the Mandi District (1.1 million) but incidence of MDR TB is higher in Mandi Districtas compared to Kangra District. The following table Shows the number of MDR TB in each District of Himachal Pradesh till the end of 2014.

Table 1 — *Total No of MDR TB cases District wise in Himachal Pradesh till December 2014*

Name of District	Population in Lacks	No of MDR TB
Kangra District	16	124
Mandi Disrict	11	130
Shimla District	10	65
Solan District	6	53
Bilaspur District	5	35
Hamirpur District	5	33
Chamba District	5	39
Una District	5	29
Kullu District	4.5	53
Kinour District	1.1	6
Lahul Sapti District	0.4	-
Total	69	567

From the above Table 1, it is evident that Mandi district with a population of 11 lacks the number of MDR TB are 130 as compared to Kangra District with a population of 16 Lakhs, the number of MDR TB are 124.

In 2012 initially a State Level CME (continue Medical Education) meeting was conducted where all District Presidents and Secretaries of IMA, all the District TB Officers, WHO consultant and IMA-RNTCP Consultant attended this meeting. This meeting was presided by the State IMAPresident. In this meeting a detail discussion was held on rising trend of MDR TB and to take steps to control it. It was decided that CME meeting will be conducted in each district involving the private health providers. All the District TB officers agreed to give logistic support for opening up of Designated Microscopic Center (DMC) and Directly Observed Treatment (DOT) center with private health providers.All the Doctors working in Private hospitals and individual qualified Medical Private Practicesoners, owner of Private Laboratories should be invited to attend such meeting. District TB Officer (DTO), Technical consultant of IMA and WHO consultant will brief the Private Health Providers about DOTS strategy and also to ensure the completion of TB treatment of 6 to 9 months.

From 2012 to 2015 continuously CME meetings were conducted in different districts by Technical Consultant of IMA, DTO and WHO consultant. Powerpoint presentations were given by the Technical consultant of IMA (i.e. Author of this article)and WHO consultant with an emphasis about compliance of TB treatment for 6 to 9 months.

After the CME was conducted in Mandi District of Himachal Pradesh State in 2012, Private Hospitals and Private Laboratories were requested to join RNTCP by signing MOU as per the guidelines of RNTCP. All the Private Hospitals agreed to open a Designated Microscopic Center (DMC) but did not agree to open a DOTS center. The reason for not opening the DOTS center were mainly due to loss of money which they are getting from the TB patients as their fees for treating TB patient. From 2012 to 2014 many Private Health Institutions after signing MOU with District TB Officeropened DMC in their establishments as per the RNTCP guidelines. After the MOU signed, the District TB officer supplied Laboratory reagents, Sputum cups, Slides etc. free of cost and Rs. 25/- per sputum slide examination were given to these private establishments who signed MOU with District TB Officer. The quality control of these DMC were done by District TB office as per the guidelines of RNTCP.

Table 2 shows the number of Sputum Positive cases detected by these private DMCs.A total of 175 Sputum positive cases were diagnosed and notified to DTO office in the year 2013 by the following private health providers The Name of the Private health providers, date of opening DMC and number sputum positive cases diagnosed in MANDI district are shown in Table 2.

A total of 170 Sputum positive cases were diagnosed and notifiedto DTO office in the year 2014 by the following Private health establishment who signed MOU with District TB Officer. The name of the Private health Providers, date of opening DMC and number sputum positive cases diagnosed by these Private Health institutions in MANDIdistrict are shown in Table 3.

A total of 187 Sputum positive cases were diagnosed and notified to DTO office in the year 2015 by the following Private health establishments who signed MOU with District TB Officer. The Name of the Private health providers,date of opening DMC and number sputum positive cases diagnosed by these Private Health institutions in MANDI are shown in Table 4.

The total Number of TB case Diagnosed and notified year wise by the Private Hospital in Mandi District from 2013 to 2015 (3 Years) are shown in Table 5.

Discussion

It is evident from the Tables 2,3 and 4 that a total of 532 Sputum positive cases were diagnosed and notified to District TB Office in 3 years timeby the Private Health Care providers. However all these cases were handed over a prescription of anti TB drugs available in the market (ie, AKT-4 and Fluroquinolone group drugs etc) by the concerned health providers and no effort was made to follow up these cases to know whether they completed the 6 months of TB treatment. In Mandi District of Himachal Pradesh has the highest number of MDR TB may be because of mismanagement of Treatment. As per WHO Multidrug Resistance TB (ie, Resistance to INH and Rifampicin) emerge and spread due to mismanagement of TB treatment. MDR TB infection may be classified as primary or acquired. Primary MDR TB occurs in patients who have not been previously infected with TB but became infected with a strain that is resistant to TB. Acquired MDR TB are due to inappropriate treatment by a medical provider who improperly prescribing ineffective treatment[4]. MDR TB may also occur due to the patient not taking medicine correctly due to a variety reasons including the cost of drug for which he does not have the money to purchase or patient's forgetfulness or patient stopping treatment early because they feel better. Drug resistant TB is a significant problem in India contributing one – fourth of global burden. An estimated one million Tb cases are not reported to Government every year and majority are believed to be in private sector. Additionally the quality of TB care in the private sector are suboptimal[5].

Mandi District which have the highest number of MDR TB (ie, 130 by the end of 2014) and Private Hospitals of this district are just handing over a prescriptionof anti TB Drugs to sputum positiveTB patientsand do not follow up to ensure the completion of TB treatment to those they have prescribed the anti TB drugs.The alarming increase

Table 2 — *Total No of TB Cases Diagnosed by the Private Health Providers in 2013*

Name of Private Health Institution in Mandi District	Date of Sign of MOU	No of TB Suspects Examined 2015	No of Found Positite
Mandav Hospital	1.10.2012	695	102
Jagruti Hospital	1.10.2012	175	42
Niramay Clinic	1.10.2012	28	1
H.S. Malhotra Hospital	1.11.2012	18	8
Sajivani Hospital (SNR)	14.12.2012	3	1
Dr. Aswani Clinic	1.09.2012	5	3
Suket Hospital	14.12.2012	14	8
Sanjivani Hospital	23.11.2012	2	1
Pushakot Clinical Lab.	29.4.2013	48	6
Mahamaya Lab. Pangna	4.6.2013	47	3
Total		1035	175(16.9%)

Table 3 — *Total No of TB Cases Diagnosed by the Private Health Providers in 2014*

Name of Private Health Institution in Mandi District	Date of Sign of MOU	No of TB Suspects Examined 2015	No of Found Positite
Mandav Hospital	1.10.2012	753	91
Jagruti Hospital	1.10.2012	117	21
Niramay Clinic	1.10.2012	2	2
H.S. Malhotra Hospital	1.11.2012	19	12
Sajivani Hospital (SNR)	14.12.2012	10	8
Dr. Aswani Clinic	1.09.2012	24	7
Pushakot Clinical Lab	29.4.2013	93	8
Harihar Hospital	1.9.2013	92	13
Standard Clinical Lab Tihar	29.8.2013	11	2
Thakur Lab. Balichauk	1.11.2013	93	5
Health Care Medical Center	14.8.2014	1	1
Total		1215	170(14%)

Table 4 — *Total No of TB Cases Diagnosed by the Private Health Providers in 2015*

Name of Private Health Institution in Mandi District	Date of Sign of MOU	No of TB Suspects Examined 2015	No of Found Positite
Mandav Hospital	1.10.2012	776	109
Jagruti Hospital	1.10.2012	175	38
Niramay Clinic	1.10.2012	2	2
H.S. Malhotra Hosp.	1.11.2012	10	5
Sajivani Hospital	23.11.2012	3	2
Dr. Aswani Clinic	1.09.2012	34	9
Pushakot Clinic Lab.	29.4.2013	176	10
Super Medical Lab.	19.8.2014	14	1
Harihar Hospital	29.4.2013	30	5
Thakur Lab. Balichauk	1.11.2013	48	6
Total		1268	187(14.7%)

Table 5 — *Total No of TB Cases Diagnosed by the Private Health Providers from 2013 to 2015*

Year	No of TB Suspects Examined	No Found Positive
2013	1035	175
2014	1215	170
2015	1268	187
Total	3518	532

in of anti TB drug resistance in India warrants the need for the structured nation wide surveillance to assist National TB control programme in strengthening the treatment strategy for improved outcomes.

MDR TB have been reported in every country surveyed and is more commonly due to Doctors giving inappropriate treatment or patient missing dosesor failing to complete their treatment. TB strains are often less fit and less transmissible but outbreaks can occur more rapidly with persons having weakened immune system (ie, Persons with HIV infection). However outbreaks among non immune compromised healthy people do occurs but less common. MDR TB was 10.34 times higher previously treated than never treated TB cases. A study in Europe showed previous treatment was the strongest determinant of MDR TB in Europe.

Conclusion

A field study in Mandi District of Himachal Pradesh was conducted to know reasons of highest number of MDR TB as compared to other Districts of Himachal Pradesh.It was observed in MANDI district from 2013 to 2015 (3 years) a total of 532 TB cases were treated by Private Health Providers.However further study is required to know out of these 532 sputum positive TB casesdiagnosed by the private Health Providershow many of them did not complete the full course of TB treatment and developed MDR TB. Compliance of full course of treatment without interruption is key to reduce MDR TB incidence.Therefore continuous CME and support should be provided to Private Health Providers who are treating TB cases.

Recommendations

Central TB Division of Ministry of Health, Government of Indiashould take appropriate measures to control MDR and XDR TB. Simply implementing the TB Notifications and counting the number TB patients notified by Private Health Providers is not going to control the occurrence MDR and XDR TB. On the contrary innovative methods on how to involve Private Practitioners and Private Hospitals to treat TB patients through DOTS strategy is important. In all the states of India, the District which have higher incidence of MDR TB should be identified and line listed and a special effort should be made in these District tomotivate Private Health providers either to sign MOU with District TB Officer to open a DMC and a DOT center in their establishment or to refer the TB suspects to the nearest DMC of RNTCP.

IMA should be involved to conduct CME about the DOT strategy. About two hundred thousand qualified Medical Practitioners are members of IMA and many of them are treating TB cases. IMA has a strong infrastructure from District to State to National Level and hold monthly CME meeting. In these CME meetings interaction with the Private Doctorsshould be done and to convince them that although they are prescribing AKT 4 (ie, 4 drugs which include Rifampicin, INH, Ethambutol and Pyrizinamide) are same as 4 drugs given in DOT by RNTCP but the only difference is compliance which is ensured in DOT strategy under direct supervision and Support.By handing over simply a prescription of anti TB drug, the patient is pushed towards MDR TB.

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Conflict of Interest : None

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Drug Resistance Tuberculosis and Prevention :

- **Patients develop drug resistant TB as a result of either irregular / inadequate treatment (acquired drug resistance) or direct spread from a person having drug resistant bacilli (primary drug resistance).**
- **Non-compliance (a global and universal phenomenon) is the most important cause of drug resistant TB.**
- **Faulty prescriptions regarding drug regime, doses, timing, duration, poor quality drugs, adding a single drug to a failing regime etc. is accountable in many cases.**
- **Socioeconomic factors (distance from hospital, patients' livelihood, addictions, social belief etc.) and administrative factors (irregular supply of drugs, administrative lacks, lack of motivation and misbehaviour of health workers etc.) are also important.**
- **Contact with drug resistant cases in family members or in close confinement.**
- **Strict adherence to RNTCP guideline is the most important preventive measure.**
- **Early detection by CBNAAT, 1st line LPA and 2nd line LPA (when necessary) followed by proper management of drug resistant TB are essential steps.**
- **Repeated patient education, particularly the danger of irregular treatment, is very important.**
- **Placing handkerchief or a piece of paper in front of mouth during coughing will bring down the spread of respiratory infections as well as TB.**

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