Record based evaluation of Revised National Tuberculosis Control Program (In Jamnagar District)

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Abstract: Background and Objectives: Tuberculosis will continue to be a major problem in foreseeable future because there is still large pool of infection in the community. Study is carried out to evaluate the impact of RNTCP and to identify the trend of Tuberculosis in Jamnagar district. Methods: A retrospective analysis of the recorded data from 2005 to 2012 obtained from District Tuberculosis centre, Jamnagar was carried out. The indicators used are: Annualized case notification, three month sputum conversion rate, success rate, mortality etc. Results: Downward trend of case notification rate is observed after 2009 except annualized new smear positive case which was not reached to 70% after 2008. The district had attained consistently satisfactory sputum conversion rates and success rate. Upward trend of failure cases is observed. Defaulter rate among the Retreatment cases was high. Mortality rate is more than 5% among New Smear Positive cases and around 12% among re treatment cases since 2008. Conclusion and Interpretation**:** there is still some challenges i.e. downward trend of case detection, Very low new smear negative case detection, high mortality, rising trend of failure cases etc. So, there is need of review of all activities and take sincere efforts to combat these challenges. [Sanghavi M M NJIRM 2013; 4(5) : 24-29]

Key Words: Evaluation, RNTCP (Revised National Tuberculosis Control Program), Performance Indicators.

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Introduction: Tuberculosis is probably the oldest disease known to mankind. Tuberculosis is a disease with devastating social and economic costs. As per the WHO Global TB Report 2011, there were an estimated 8.8 million incident cases of TB (range, 8.5 million-9.2 million) globally in 2010, 1.45 million deaths due to tuberculosis. India has more new TB cases annually than any other country. India is contributing to a fifth of the global burden of TB. The recent estimate by WHO gives a prevalence of 3 million in India. More than 80% of the burden of tuberculosis is due to premature death, as measured in terms of disability-adjusted life years lost. WHO estimated TB mortality in India as 280,000 (23/100,000 population) in 2009. The disease incidence peaks in people belonging to the most economically productive age group of 15-60 years. The link between TB and HIV is also quite significant[1].

The campaign against Tuberculosis in India is accomplished through an official program, The National Tuberculosis Program (NTP) which was launched in 1962. However, the treatment success rates were unacceptably low and the death & default rates remained high. In order to overcome these lacunae, the Government decided to give a new thrust to TB control activities by revitalizing the NTP, with assistance from international agencies, in 1993. The Revised National TB Control Program (RNTCP) thus formulated, adopted the internationally recommended Directly Observed Treatment Short-course (DOTS) strategy, as the most systematic and cost-effective approach[1]. In Gujarat, RNTCP was expanded to all the districts in phased manner from 1998 and by April 2004, we have covered up whole Gujarat State under the RNTCP[2]. RNTCP has been achieving the global targets of 70% case detection rates and more than 85% success rates amongst the New Smear Positive TB patients since 2007. RNTCP defined newer objectives of 'Universal Access to TB Care' for TB control in India in 2010. However with nearly 40% of the Indian population infected with the TB bacillus, this large pool of infected people means that TB will continue to be a major problem in the foreseeable future[1]. So, it needs to be studied in detail and evaluated all-round. Estimation and regular measurement of TB disease burden is important for reviewing the progress towards the Millennium Development Goals related to TB. STOP TB Partnership targets also are measurable in terms of TB disease burden. A study was conducted to observe the impact of RNTCP and to know the trend of Tuberculosis in Jamnagar district.

Material and Methods: A retrospective analysis of the recorded data obtained from District Tuberculosis centre, Jamnagar of Eight years (2005 to 2012) was carried out. For the purpose of assessing the progress of RNTCP in Jamnagar District, the quarterly performance reports from 2005 to 2012 were collected. A standardized set of performance indicators have been identified to monitor RNTCP. The indicators used are: Annualized case notification rate, Trend of 3 month sputum conversion rate, success rate, failure rate, defaulter rate, mortality etc. Average value of these quarterly performance reports were calculated to obtain annual value of performance indicators. These indicators help in assessing the performance of the program in the district. Trends have been determined using simple regression analysis and graphic analysis. P values <0.05 were considered significant.

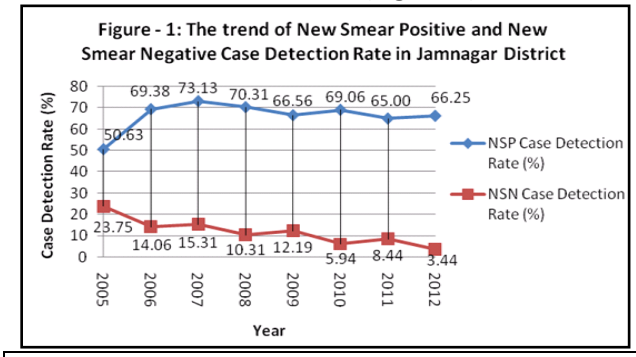
Results: The various annualized case notification rates of tuberculosis cases of Jamnagar district from 2005 to 2012 was depicted in Table 1.

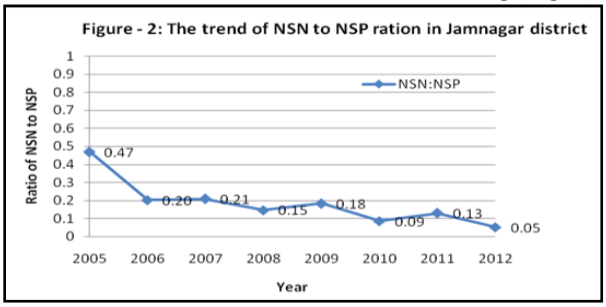
Table:1 : Annualized Total case notification rate, NSP case notification rate, NSN case Notification rate, Retreatment case notification rate in Jamnagar district

Annualized Case Notification Rate (Per lakh Population)	Year							
	2005	2006	2007	2008	2009	2010	2011	2012
Annualized Total Case Notification Rate	108.5	113	120.5	119.5	122.75	115.5	107.5	97.5
Annualized NSP Case Notification Rate	40.5	55.5	58.5	56.25	53.25	55.25	52	54
Annualized NSN Case Notification Rate	19	11.25	12.25	8.25	9.75	4.75	6.75	3
Total Re-Treatment Smear Positive Case	21.5	23.25	25.25	26.25	27	21.25	19.75	18.5
Relapse Case Notification Rate	15.75	16.5	15.5	17	16	14.75	11.75	10.9
Failure Case Notification Rate	0.75	1	2	2.5	2.75	1.75	4	1.8
Treatment After Default Case Notification Rate	5	5.75	7.75	6.75	8.25	4.5	4.75	5.13

The annualized total case notification rate was rising from 2005 (108.5 cases per one lakh population) to 2009 (122.75 cases per one lakh population). Then, the trend of annualized total case notification rate was significantly declining from 2009 to 2012 (r= -0.99, R^2adj=0.99, t=18.99, p<0.01) and reached to lowest in 2012 where it was 97.5 cases per one lakh population (Table 1).
The trend of annualized NSP (New Smear Positive) case notification rate was fluctuating from 2006 to 2012 between 65% and 74% (Figure 1).

It is noteworthy that annualized NSP case notification rate was not reached to 70% after 2008 (Figure 1). The trend of annualized NSN (New Smear Negative) case notification rate was declining from 2005 to 2012 (r= -0.91, R^2adj=0.79, t=5.31, p<0.01) (table 1). The NSN to NSP ratio was also declined significantly from 2005 (0.47) to 2012 (0.05) in Jamnagar district (r= -0.83, R^2adj=0.63, t=3.63, p<0.05). It was also observed that the gap between the case detection rate between NSP and NSN case was increasing (Fig.2).





It was observed that the total re treatment smear positive case notification rate is increased from 21.5 cases per lakh population in 2005 to 27 cases per lakh population in 2009 and then it was declined and reached to 18.5 cases per lakh population in 2012. Relapse case notification rate is also declined after 2008 from 17 cases per lakh population (2008) to 10.9 cases per lakh population in 2012. Failure case notification rate showing rising trend from 2005 (0.75 cases per lakh population) to 2011 (4 cases per lakh population) with a decline in 2010 (1.75 cases per lakh population).

Table:2: Three month sputum conversion rate and success rate of smear positive cases in Jamnagar district

Indicator	Year						
	2005	2006	2007	2008	2009	2010	2011
Three month sputum conversion rate (%)	90.5	92	91.25	90.73	90.95	91.9	90.56
Trend Of Success Rate Of NSP Patient (%)	90	89.75	86.75	87.25	86.25	84.5	85.95
Success Rate Of Smear Positive Previously Treated (%)	64.5	71.25	61.75	60.5	60.5	55.5	55.2

It was also declined in 2012 to 1.8 cases per one lakh population. Treatment after default case notification rate was increased from 5 cases per lakh population in 2005 to 8.25 cases per lakh population in 2009 and then it was sharply declined in 2010 (4.5 cases per lakh population) after that it was slightly increased and reached to 5.13 cases per lakh population in 2012.

The district had attained consistently satisfactory sputum conversion rates and is more than 90% for all the years. Though the district has achieved the treatment success rate of more than 85% from the year 2005 onwards except in 2010 where it was 84.5% but the trend of success rate of NSP patients was declining significantly from 90% in 2005 to 85.95% in 2011 ($r= -0.89$, $R^2adj=0.74$, $t=4.53$, $p<0.01$). It is also observed from table 2 that the trend of Success Rate of Smear Positive Previously Treated is also significantly declining ($r= -0.85$, $R^2adj=0.67$, $t=3.67$, $p<0.05$).

The trend of cure rate in NSP is consistent and cure rate is more than 85% from 2005 onwards except in 2010 where it was 84.25%. While the trend of cure rate in previously treated patient is sharply rise from 59.75% in 2005 to 68.5% in 2006 and then it was declined up to 52.25% in 2010. In the year 2011, it was slightly raised to 54.76%. The trend of treatment completed in NSP patients is declining from 1.5% in 2005 to 0.35% in 2011. While trend of treatment completed in previously treated patients is declining from 2005 (6.5%) to 2007 (1%) and then it was rising to 3.75% in 2009 and again decreased to 0.56% in 2011. The trend of died in NSP patients is slightly increased to 5.75% in 2008 and then it is consistent up to 2011.Similar consistent trend of died in previously treated patients is observed from 2007 to 2011 around 12%. Significant upward trend of failure cases in NSP ($r= 0.85$, $R^2adj=0.66$, $t=3.57$, $p<0.05$) and in previously treated patients ($r= 0.93$, $R^2adj=0.87$, $t=5.7$, $p<0.01$) is observed while the trend of default cases is not consistent. (Table 3)

Discussion: The RNTCP has set certain expected levels of performance against which the calculated performance indicators are compared. ARTI (Annual Risk of Tuberculosis Infection) is the One of the key epidemiological indicators of the tuberculosis situation in a community. It represents the proportion of population that gets newly infected (or re-infected) with tubercle bacilli over the course of one year. Currently the average ARTI in the West Zone (including Gujarat) is estimated to be 1.6%[3]. This means that, there will be 80 new smear positive cases, 80 new smear-negative cases, 40 re-treatment cases and 16 extra-pulmonary cases totaling to 216 cases per 100,000 populations per year.

Case notification rate indicates the extent to which patients with new pulmonary smear positive TB is being treated by the public health system. Annualized total case notification rate showed downward trend after 2009 in the district from 122.75 per lakh population in 2009 to 97.5

per lakh population in 2012 in the present study. Similar downward trend was observed in the state Gujarat after 2007 from 145 per lakh population in 2007 to 120 per lakh population in second quarter of 2012[4]. Though the trend of case notification rate of the district is similar to the state trend but case notification rate is quite low as compared to state

Table:3: Trend of Treatment outcome in NSP and Previously treated cases in Jamnagar District

Trend Of Treatment Outcome In NSP Patient							
Year	2005	2006	2007	2008	2009	2010	2011
Cure (%)	87.5	88	86.25	87	86	84.25	85.6
Completed (%)	1.5	1	0	0.25	0	0.57	0.35
Died (%)	4	3.5	3.75	5.75	6.25	5.37	5.63
Failure (%)	1.5	0.5	1.67	1.75	2	4.02	3.5
Default (%)	2.75	3	4.75	3.25	3.75	4.3	4
Trend Of Treatment Outcome In Previously Treated Patient							
Year	2005	2006	2007	2008	2009	2010	2011
Cure (%)	59.75	68.5	60.5	55.5	57	52.25	54.76
Completed (%)	6.5	2.75	1	2	3.75	3.15	0.42
Died (%)	8.75	7	11.37	11.75	12.25	12.57	12.76
Failure (%)	4.25	2.75	5.5	7.75	9.75	8.6	11.74
Default (%)	13.5	9.75	12	15.75	15	17.62	12.86

As per RNTCP guideline, NSP (New smear Positive) case detection rate should be at least 70%[5]. Annualized NSP case detection rate was consistently less than 70% after 2008 in Jamnagar district put the district in Low detection category. Most of the districts in Gujarat state has achieved case detection rate above 70% during this period[2]. The detection of smear negative cases also needs improvement for effective control of TB in the community. There should ideally, be a one to one relationship between the number of new smear negative cases and new smear positive cases. From field conditions and other practical considerations, variation in the range of 0.4 to 1.2 was found satisfactory. In the present study, The NSN to NSP ratio was also declined sharply from 2005 (0.47) to 2012 (0.05) indicating the increasing gap between the case detection of NSP and NSN cases. Lesser proportion of NSN cases could be due to overreliance on sputum results denouncing the Chest X ray report despite that NSN cases be as frequent. The total retreatment smear positive case notification rate is also declined after 2009 (27 cases per lakh population) and reached to 18.5 cases per lakh population in 2012 suggesting some serious public health efforts for case detection, compliance and management. So, the district has to put in more efforts to improve its performance in terms of case detection.

New Smear positive cases should have at least 90% conversion from sputum positive to negative at the end of three months of treatment as per RNTCP guideline[5]. The district had also attained consistently satisfactory sputum conversion rates during study period. A high conversion rate is usually followed by high cure rate, except in special situations where there is high HIV incidence also. The cure/success rate achieved for new pulmonary Smear-positive cases is the best and most important indicator of effectiveness of chemotherapy in treating TB cases and hence success of the program. The district has achieved the treatment success rate satisfactory from the year 2005 onwards though the trend is slightly downward in the district. The success rate in the district is around 85% since last two years and is slightly lower than the state success rate. So, the impact indicators are in consistence with program targets of the RNTCP in district. Success Rate of Smear Positive Previously Treated is also declining up to 55.2% in 2011. Hemlata, Kavita Narang, Sushma Kumari Sainiin in Dadu majra colony of Chandigarh observed percentage of 3 month conversion rate of new smear positive patients and cure rate of new smear positive cases were less than the expected level in 2008 but very near to its recommendations[6]. Contrary to this finding, Jyothi Conjeevaram, Susmitha Kuntumalla, Prabakaran Jayaraman in Nellor district, Andhra Pradesh observed cure rates 92.3% among New Smear Positives and 67.65% among the re-

treatment cases[7]. A study by Kaur G et al in Chandigarh showed a cure rate of 97.9% among new smear positives and 63.5% in re-treatment cases[8].

Failure rate should be less than 4% of new smear positive patients as per RNTCP guideline[5]. Failure rate among new positive cases is approaching 4% since last 02 years in the district. While failure rate among re treatment cases was around 10% since last three years. Upward trend of failure cases in NSP and in previously treated patients is also observed in the present study. Kaur G et al in 2004 – 2005 observed failure rate of 5.8% among patients on Category 2, 1.2% among Category 1 and 4% in Category 3 patients in Chandigarh[8].

RNTCP guidelines indicate an overall defaulter rate not more than 5% and action is warranted if it is more than 10% among new smear positive cases. The present study showed an overall treatment defaulter rate is around 5% since last three years in the district and less than 5% among NSP cases during study period. Default rate among Re treatment cases was fluctuating between 10% and 18% during study period. It is observed from the present study that the defaulter rate among the Retreatment cases was high when compared to those from New Smear Positives. Similar findings were observed by Jyothi Conjeevaram, Susmitha Kuntumalla, Prabakaran Jayaraman in Nellor district, Andhra Pradesh in 2007. They also showed that an overall treatment defaulter rate of 3.03% and among New Smear Positive cases it was 1.29% and 10.25% in Re-treatment cases which was slightly lower than present study[7].

Under RNTCP the mortality rate should not be more than 5% of all smear positive patients[5]. It is observed in the present study that mortality rate is more than 5% among New Smear Positive cases and around 12% among re treatment cases since 2008. While Jyothi Conjeevaram, Susmitha Kuntumalla, Prabakaran Jayaraman in Nellor district, Andhra Pradesh in 2007 observed mortality among New Smear positive patients was 2.56% and death rate of 12.8% among re-treatment cases[7]. In the present study was unacceptably high as per the guidelines. These high rates must be minimized, by better supervision of the category II patients, since chemotherapeutic agents used in DOTS regimen are of proven efficacy.

Conclusion: It was finally concluded that RNTCP was making a good impact in terms of some indicators in the district i.e. three month sputum conversion rate and cure rate of NSP cases in the district were maintained as per RNTCP guideline. The default rate was also maintained at expected level as per RNTCP guideline. But analyzing the performance of RNTCP, there is still some challenges i.e. downward trend of case detection rate, low case detection of NSP cases, Very low NSN case detection, downward trend of cure rate, high mortality, rising trend of death and failure cases etc. If these challenges are not attended then the tuberculosis situation may be worsened in the district. So, there is a need of review of all activities aimed at controlling the tuberculosis and do sincere efforts to combat these challenges.

Recommendations: To sustain the performance and break the transmission of TB, it is recommended that district has to put in more efforts to improve case detection. Identification of re-treatment cases and the proportion of smear negative cases were low. It is therefore very essential to stress on the need to take the past history and treatment history carefully. Information, education and communication activities need to be strengthened to create awareness about RNTCP in the community. Private sector through intensified Public Private Partnership (PPP) activities should be involved in the district to improve the case detection rate. The high quality of care and strict adherence to the RNTCP guidelines should be continued and maintained to sustain the smear conversion and success rates already achieved by the district under the program. High mortality rates must be minimized by better supervision especially of the category 2 patients, since chemotherapeutic agents used in DOTS regimen are of proven efficacy. Regular monitoring and surveillance should be done to lower failure rate and defaulter rate. Further study should be done to explore the

reasons for low case detection and high mortality in the district.

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