IMPACT OF COVID-19 PANDEMIC ON TUBERCULOSIS NOTIFICATIONS (2019- 2022) IN THE STATE OF PUNJAB

Dissertation Submitted to the

IIHMR University, Jaipur

for the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management/

by

Dr Aastha Maingi

Under the Supervision and Guidance of

Dr (Col.) Mahendra Kumar

2022

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Impact of Covid-19 Pandemic On TB Notifications (2019-2022) in the state of Punjab** is the bonafede record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

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TO WHOMSOEVER IT MAY CONCERN

I am pleased to recognize the good work done by Dr. Aastha Maingi, 2nd year Student of MBA at IIHMR, University, Jaipur as a part of her Internship program in this office for the period from 25-03-2022 to 22-06-2022. Dr. Aastha Maingi did her internship in NTEP Division under NHM in Department of Health & Family Welfare, Punjab.

I found her efforts sincere, meticulous and result oriented. I wish her all the best in her future endeavor.

30.6.22

Director
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CERTIFICATE

This is to certify that dissertation titled *Impact of COVID-19 pandemic on TB Notifications in state of Punjab during the period 2019-2022* is a record of the research

work undertaken by *Dr Aastha Maingi* in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide: Dr (Col.) Mahendra Kumar
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Date: 01/07/2022

ABSTRACT:

Background: Coronavirus disease 2019 (COVID-19) and Tuberculosis (TB) are two major infectious diseases posing significant public health threats, and their coinfection (aptly abbreviated COVID-TB) makes the situation worse. As per WHO, India is worst TB hit nation and the COVID-19 pandemic has only worsened the scenario. This study aimed to analyse the impact of COVID-19 in the state of Punjab.

Methods: The study is descriptive in design with a sample size of population of all the twenty-two districts in the state. The duration of the study was of three months i.e., March'22 to June'22. The data taken for analysis was extracted from the NIKSHAY portal. The study was conducted at the Directorate of health and Family Welfare, Punjab. The study was conducted after thorough approval from the NHM authorities, and the confidentiality of the government data was precisely maintained throughout the course of the training.

Results: There was a significant decrease in the TB notification rate in the year 2020 following the first wave of COVID. The rates grew better and recovered in 2021 and 2022. Along with the notification rate, indicators like PTER and outcome indicators like death rate, default rate and treatment success rates have also been analysed. The study has attempted to show the trends in the indicators both at the state and district level. Further attempts have been made to understand the relationship between the indicators under consideration and back up the findings with presumptive reasoning.

Financial Aid: None

Conflict Of Interest: None

ACKNOWLEDGEMENT

The internship and dissertation opportunity I had with National Health Mission (NHM), Punjab was an excellent opportunity for learning and professional development. I would like to extend my deepest gratitude to all those who provided me with a chance to work on the study at the organisation during my internship.

First and foremost, I would like to thank Dr Areet Kaur, Director NHM and Health and Family Welfare, Punjab for allowing me to work at this organisation which bears the responsibility of sound health of the people of its state, especially, in this crucial and testing times where we are recovering from the deadly COVID-19 pandemic.

Next and most importantly, I would like to thank Dr Rajesh Bhaskar, State Program Officer for NTEP,NLEP and COVID Outbreak and my industry mentor. His valuable guidance and his ever-consistent availability to answer my queries and doubts and guiding me throughout my period of training at NHM was indispensable to the successful completion of my training.

Also, I would like to extend my gratitude to Dr Pooja Kapoor, State WHO Consultant for NTEP, for providing me with valuable suggestions, resources and inputs every now and then to enrich my research thesis work.

Further, I would like to extend my gratitude to Mrs Rukmani, Data Entry Operator for NTEP, who made me understand the NIKSHAY portal and all the relative minute details of the same. Additionally, I would like to thank the entire staff of NTEP program who were always ready to help regarding any doubts and issues whenever and wherever I had faced during the training period.

Next, I would like to thank Dr (Col.) Mahendra Kumar, my college mentor for being such an excellent guide with his valuable guidance and support.

Last but not the least, I would like to thank my family and friends, who were a constant source of motivation and support and kept me persistent throughout my journey at IIHMR.

Sincerely,

Dr Aastha Maingi

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ABBREVIATIONS:

- ACF: Active Case Finding
- COVID-19: Coronavirus Disease of 2019
- CTD: Central Tuberculosis Division
- DRTB: Drug Resistant Tuberculosis
- DSTB: Drug Sensitive Tuberculosis
- EPTB: Extra-Pulmonary Tuberculosis
- HIV: Human Immunodeficiency Virus
- HR: Human Resources
- JEET: Joint Effort for Elimination of Tuberculosis.
- NHM: National Health Mission
- NTEP: National Tuberculosis Elimination Program.
- PHSC: Punjab Health System Corporation
- PPSA: Patient Provider Support Agency
- PTB: Pulmonary Tuberculosis
- PTER: Presumptive TB Examination Rate
- SARS-CoV: Severe Acute Respiratory Syndrome Coronavirus
- WHO: World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background Research:

COVID-19: As we are remarkably familiar by now, Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some people could become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.

The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing, or breathe. These particles range from larger respiratory droplets to smaller aerosols. It is important to practice respiratory etiquette, for example by coughing into a flexed elbow, and to stay home and self-isolate until you recover if you feel unwell. The best way of prevention is to be aware and well informed about the modes of transmission and by taking all the necessary precautions.

Tuberculosis: TB is caused by bacteria (Mycobacterium tuberculosis) that most often affect the lungs. Tuberculosis is curable and preventable. TB spreads from person to person through the air. When people with lung TB cough, sneeze, or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infected.

About one-quarter of the world's population has a TB infection, which means people have been infected by TB bacteria but are not (yet) ill with the disease and cannot transmit it. When a person develops active TB disease, the symptoms (such as cough, fever, night sweats, or weight loss) may be mild for months. This can lead to delays in seeking care, and results in transmission of the bacteria to others. People with active TB can infect 5–15 other people through close contact over the course of a year. People infected with TB bacteria have a 5–10% lifetime risk of falling ill with TB. Those with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a higher risk of falling ill. Without proper treatment, 45% of HIV-negative

people with TB on average and approximately all HIV-positive people with TB are susceptible to death.

Dual burden of TB and COVID-19

Tuberculosis (TB) and COVID-19 are both infectious diseases that attack primarily the lungs. Both diseases have similar symptoms such as cough, fever and difficulty breathing. TB, however, has a longer incubation period with a slower onset of disease.

While experience on COVID-19 infection in TB patients remains limited, it is anticipated that people ill with both TB and COVID-19 may have poorer treatment outcomes, especially if TB treatment is interrupted. TB patients should take precautions as advised by health authorities to be protected from COVID-19 and continue their TB treatment as prescribed.

1.2 Purpose of Research:

The coronavirus (COVID-19) pandemic has caused enormous health, social and economic impacts in 2020 and 2021. This includes impacts on the provision of and access to essential tuberculosis (TB) services, the number of people diagnosed with TB and notified as TB cases through national disease surveillance systems, and TB disease burden (incidence and mortality).

A widely available indicator that can be used to assess the impact of disruptions caused by the COVID-19 pandemic on essential TB services at country level is the national number of monthly or quarterly notifications of people diagnosed with TB. This indicator reflects impacts on access to diagnosis and treatment on both the supply side (e.g., capacity to continue to provide services) and the demand side (e.g., willingness and ability to seek care in the context of lockdowns and associated restrictions on movement, concerns about the risks of going to health care facilities during a pandemic, and stigma associated with similarities in symptoms related to TB and COVID-19).

India contributes nearly a quarter of the global tuberculosis burden. Currently, this silent epidemic has been overshadowed by the ongoing coronavirus 2019 disease (COVID-19) pandemic. Once tuberculosis dropped off the radar of public health and political priority, several gaps have emerged that have caused a huge setback to our National Tuberculosis Elimination Program (NTEP). In India,

all tuberculosis notifications are electronically communicated through the NIKSHAY platform maintained by the Government of India. In particular, reduced, and delayed notifications of newly detected cases has remained a problem.

CHAPTER 2: REVIEW OF LITERATURE

The review includes the studies related to relationship between COVID-19 and Tuberculosis.

Table 12: Table showing the literature review of various research articles related to COVID-19 and Tuberculosis

S.No.	Study	Author	Summary Statement
1.	Worldwide Effects of Coronavirus Disease Pandemic on Tuberculosis Services, January–April 2020. - **September, 2020**	Prof. Migliori	Coronavirus disease has disrupted tuberculosis services globally. Data from 33 centres in 16 countries on 5 continents showed that attendance at tuberculosis centres was lower during the first 4 months of the pandemic in 2020 than for the same period in 2019. For most TB centres during their respective national lockdowns in the first 4 months of 2020, reductions in TB-related hospital discharges were found, newly diagnosed cases of active TB, total active TB outpatient visits, and new LTBI and LTBI outpatient visits. These results may be explained by a general decrease in the use of health services, including emergency services Resources for TB service provision were reassigned to other medical services. Outpatient visit numbers may have decreased because of patients' fear of exposure to severe acute respiratory syndrome coronavirus. Access to medical services may have decreased because of interruptions in or difficulty accessing public transportation, although health-related travel was permitted in most countries. Resources are needed to ensure

			tuberculosis care continuity during the pandemic.
2.	Covid-19's Devastating Effect on Tuberculosis Care — A Path to Recovery **January 15, 2022**	Madhukar Pai, M.D., Ph.D., Tereza Kasaeva, M.D., Ph.D., and Soumya Swaminathan, M.D	Organization (WHO) Global Tuberculosis Report 2021, case notifications have plummeted because of pandemic-related disruptions in services.2 For the first time in more than a decade, tuberculosis mortality has increased.2 Even as high-income countries roll out Covid-19 vaccine boosters and stockpile millions of vaccine doses, many low- and middleincome countries are struggling to obtain vaccines. Tuberculosis deaths have increased because of reduced access to care. In 2020, there were roughly 1.5 million tuberculosis deaths worldwide, representing the first year-over-year increase in tuberculosis deaths since 2005 (see figure). Other negative pandemic-related effects include a 15% reduction in the number of people treated for drug-resistant tuberculosis, a 21% decrease in people receiving preventive treatment for tuberculosis infection, and a decrease (from $5.8 billion to $5.3 billion) in global tuberculosis spending between 2019 and 2020. The path to recovery will require both immediate, short-term steps and longer-term actions. First, ending the Covid-19 pandemic quickly is critical for rebuilding tuberculosis services and other essential health services. Second, we need to highlight the worsening tuberculosis epidemic. Third, improving case detection is an urgent priority. Another long-term strategy involves increasing investment in the development of new tuberculosis tools, taking advantage of the scientific advances that rapidly produced Covid-19 vaccines, diagnostics, and drugs.

3.	Early View Tuberculosis and COVID-19 co-infection: description of the global cohort Tuberculosis and COVID-19 co-infection: description of the global cohort - **March, 2022.**	Giovanni Battista Migliori	High mortality (11%) was observed with COVID-19/TB co-infection associated with older age, male gender and invasive ventilation. Efforts to avoid SARS-CoV-2 infection in TB patients, including vaccination are recommended to prevent excess morbidity and mortality. Abstract Information on tuberculosis (TB) and COVID-19 is still limited. The aim of this study is to describe the features of the TB/COVID-19 co-infected individuals from a prospective, anonymised, multi-country register-based cohort with special focus on the determinants of mortality and other outcomes. The data suggests TB and COVID-19 are a 'cursed duet' and need immediate attention. TB should be considered a risk factor for severe COVID disease and patients with TB should be prioritised for COVID-19 preventative efforts, including vaccination.
4.	Impact of the COVID-19 pandemic on TB infection testing - **October, 2021**	V. Schiza, M. Kruse, Y. Xiao, S. Kar, K. Lovejoy, P. Wrighton-Smith, A. Tattersall	The decrease in routine testing and contact tracing may have increased the risk for future TB cases. Although the lockdown limited large gatherings, and so reduced the risk of TB transmission outside of households, lockdowns could increase TB transmission within households. Furthermore, a fear of contracting COVID-19 in health facilities may have discouraged people from seeking medical help. Also, the diversion of healthcare resources, facilities and infectious disease personnel to the fight against COVID-19 may have led to fewer TB tests being ordered. In addition, the symptoms of pulmonary TB and COVID-19 can overlap, raising the possibility of undiagnosed TB infections without proper vigilance. The significant decrease in TB infection testing during the COVID-

			19 pandemic reported by many countries, suggests that the pandemic could increase the global TB burden.
5.	Previous and active tuberculosis increases risk of death and prolongs recovery in patients with COVID-19 **- July, 2020**	Karla Therese L.; Nel Jason L. Haw; Jhanna Uy.	There is a growing literature on the association of SARS-CoV-2 and other chronic conditions, such as noncommunicable diseases. However, little is known about the impact of coinfection with tuberculosis. We aimed to compare the risk of death and recovery, as well as time-to-death and time-to-recovery, in COVID-19 patients with and without TB. The risk of death in COVID-19 patients with tuberculosis was 2.17 times higher than in those without The risk of recovery in COVID-19 patients with tuberculosis was 25% lower than in those without. Similarly, time-to-death was significantly shorter and time-to-recovery significantly longer in patients with tuberculosis. Our findings show that coinfection with tuberculosis increased morbidity and mortality in COVID-19 patients. Our findings highlight the need to prioritize routine and testing services for tuberculosis, although health systems are disrupted by the heavy burden of the SARS-CoV-2 pandemic.

CHAPTER 3: METHODOLOGY

3.1 Research Question:

How has the pandemic of COVID-19 impacted the Tuberculosis notifications in the state of Punjab from the time period of January to December in four years of 2019-2022?

3.2 Research Objective:

- To analyze the impact of Covid-19 on the number of TB notifications against the yearly targets as set by the Govt of India.
- To analyze the Presumptive TB examination Rate (PTER) and TB Notification Rate of the given period of each of the 22 districts of the state of Punjab.
- To understand the reasons behind the change in the notification rate in the given period.
- To analyze the impact of covid on the death rate of the individuals in every district of the state of Punjab.
- To figure out the default rate in the Tb notifications in the given period.
- To analyze the treatment success rate in every district throughout the given period.

3.3 Study Design and Setting:

The study was quantitative in structure and descriptive/ explorative in design. The data used for analysis was taken from the NIKSHAY- portal , set up by the Government of India to monitor the data regarding Tuberculosis in the country and monitor the outcomes of implementation of NTEP program. The time period is 2019 to 2022. The study was conducted during the period of March'22 to June'22 at the Directorate of Health and Family Welfare (Parivar Kalyan Bhawan), Punjab.

3.4 Study Population and Sample size

It included the population of all the twenty-two districts of the state of Punjab. The sample size is inclusive of both public and private sector TB notifications of all the twenty-two districts of Punjab. Total Sample size is as follows (year wise):

- 2019= 57834
- 2020= 46414
- 2021= 51182
- 2020= 56072 (Sample size for the year has been annualised as the data for notifications has been taken for first six months of 2022)

3.5 Inclusion and Exclusion Criteria

Inclusion:

- It includes the data of all the districts irrespective of the type of TB (PTB, EPTB) and the age and gender of the individuals.
- Data for the Notification rate is taken of the diagnosed individuals i.e., the individuals which are diagnosed in any health facility of Punjab irrespective of their parent state.
- Also, for the data of TB notifications, total is taken that is inclusive of both private and public sector notifications.

Exclusion:

- Patients detected with drug resistant tuberculosis are excluded from the data taken for analysis owing to their extended treatment regimens which may/may not change during treatment.
- The data for district Malerkotla has not been taken separately and is included in District Sangrur since the district is newly formed (2021) and the data is not yet segregated and available on the NIKSHAY portal.

3.6: Analysis of data:

Data is analysed using the softwares, Microsoft Excel and Tableau.

3.7 Ethical Considerations:

The study was conducted after all the necessary approvals from the NHM officials. The objective and purpose were well communicated to the officials before proceeding with it.

To maintain the confidentiality of the government data, only selective reports were analysed as a part of the study during the time period of March'22 till June'22.

3.8 Limitations:

- To ensure correct data for the year 2022, the data has been annualized since the data availability until the training tenure was of six months (Jan'22 to Jun'22).
- Also, presumptive hypothesis has been undertaken to understand the reasons of change in the notifications since no field study was conducted in the period of 2019-2022 for the same.

CHAPTER 4: FINDINGS:

4.1 Presumptive TB examination Rate:

Presumptive TB refers to a patient who presents with symptoms or signs suggestive of TB (previously known as a TB suspect). The calculation is integral to understand the data of the Tuberculosis notifications over the given period.

It is calculated as = (Total Presumptive cases tested in the year) / Total Population in the year (in Lac.)

NOTE: Data for the year 2022 has been annualised for the ease of analysis as the data is available for only the first quarter (January-March) on the NIKSHAY portal.

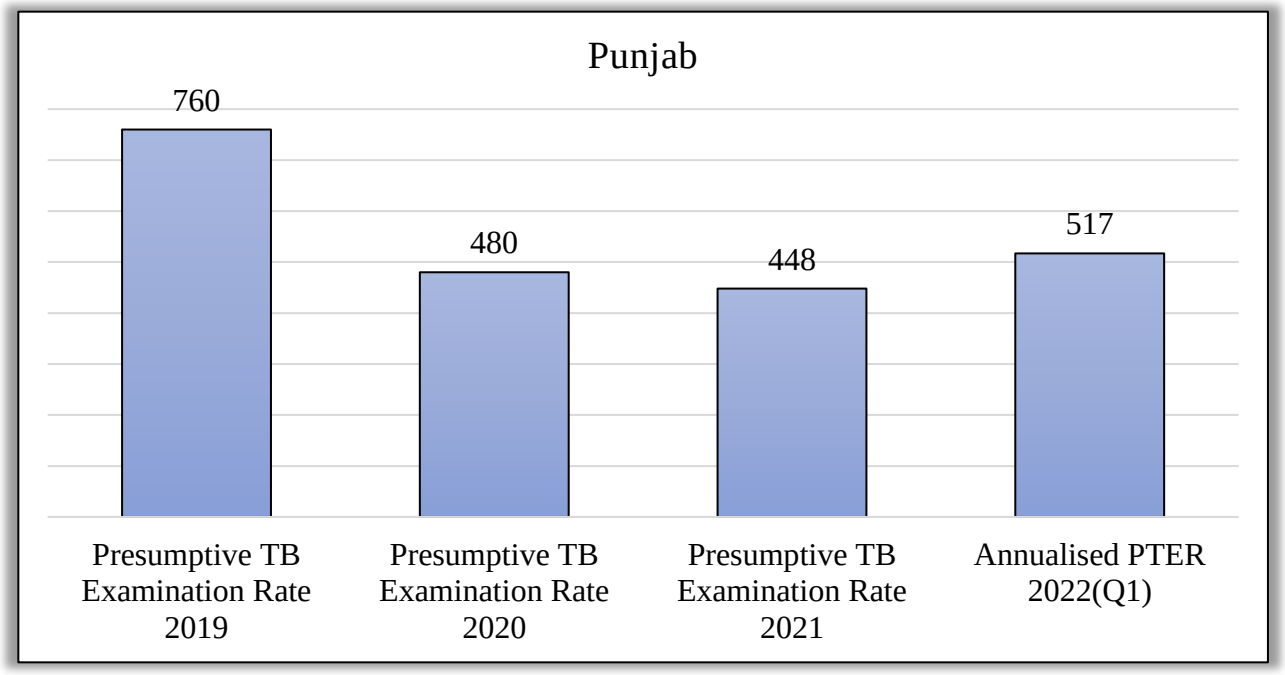

Figure 1: Broad Comparison of PTER in the state of Punjab from 2019 to 2022..

Observation: We can appreciate the decreasing trend of the presumptive TB examination rates in Punjab significantly in the year 2020 during the first country wide lockdown and first wave of the pandemic and it has only decreased further in 2021 during the deadlier second wave. The rate is expected to improve in 2022.

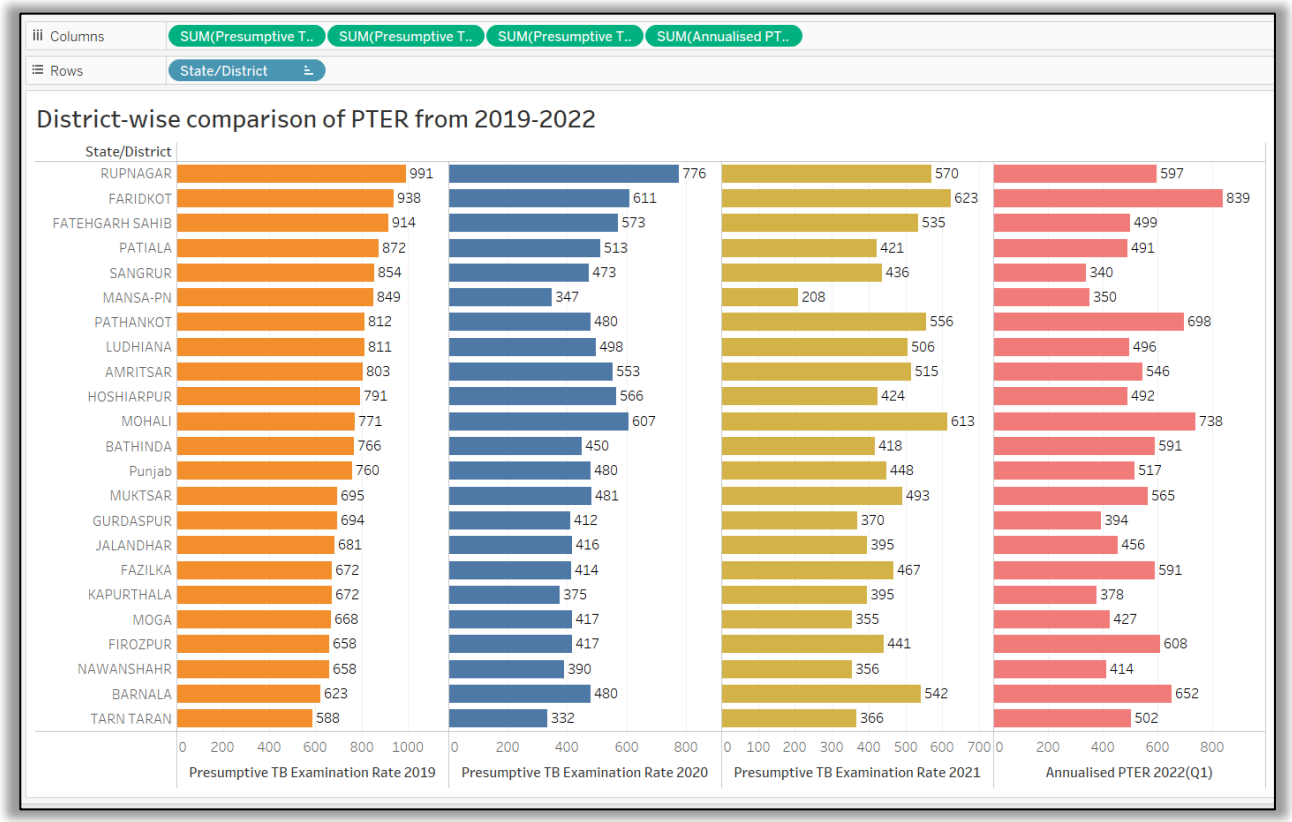

Figure 2: District wise comparison of PTER from the period 2019-2022 in Tableau.

Observation: We can see that the PTER has uniformly decreased across each district from 2019 to 2021 leading to state level decrease as shown in the previous graph as well. We can also see the districts with the highest PTER and those with the lowest rates across the years. Rupnagar shows the best testing rates followed by Faridkot and Fatehgarh Sahib while Barnala and Tarn Taran have the lowest testing rates per lakh population. The rates are expected to improve in the year 2022 for each district.

4.2 Tuberculosis Notification Rate:

This indicator depicts the number of TB cases (new and relapse) notified to the national health authorities during a specified period of time per 100,000 population.

NOTE: Data for the year 2022 has been annualised for the ease of analysis as the data is available for only the first half of the year i.e, six months (January-June) on the NIKSHAY portal.

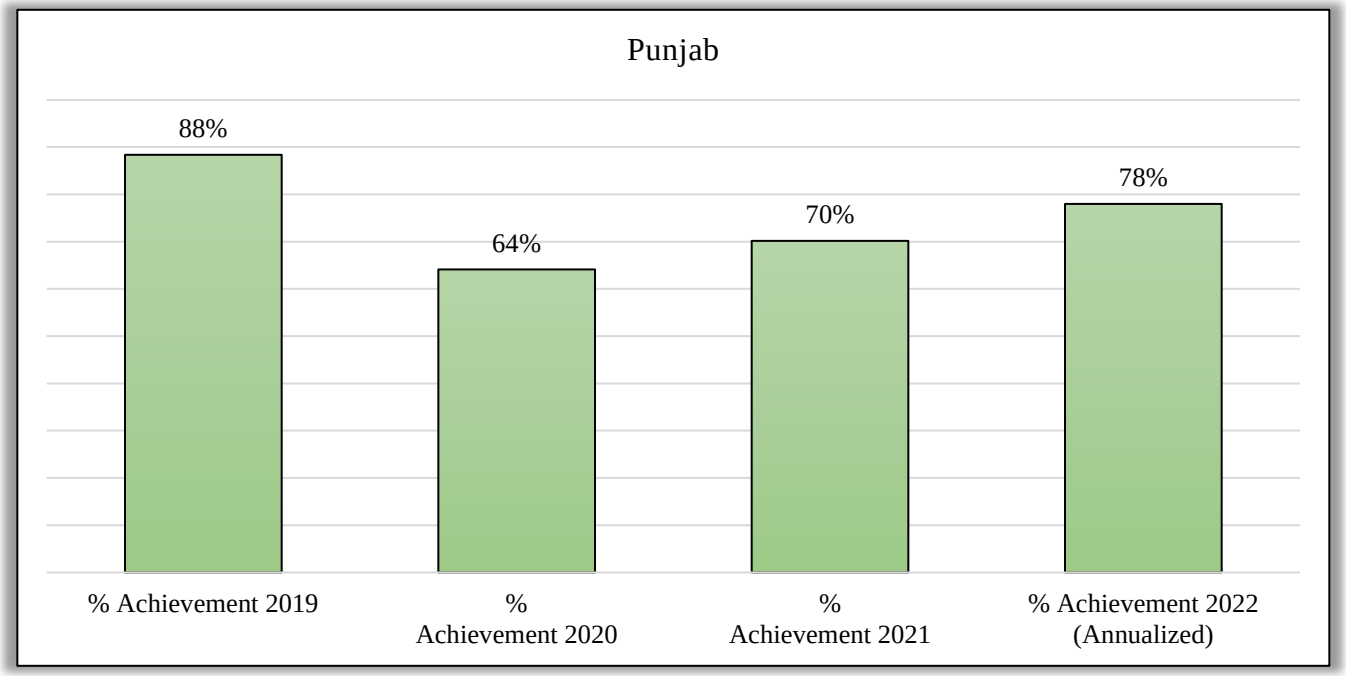

Figure 4: Broad Comparison of TB Notifications for the state of Punjab from 2019-2022.

Observation: We can appreciate the decreasing trend of the Tuberculosis Notification rates in Punjab significantly in the year 2020 during the first country wide lockdown and first wave of the pandemic However, the trends show improvement in 2021 and are expected to improve further in the year 2022.

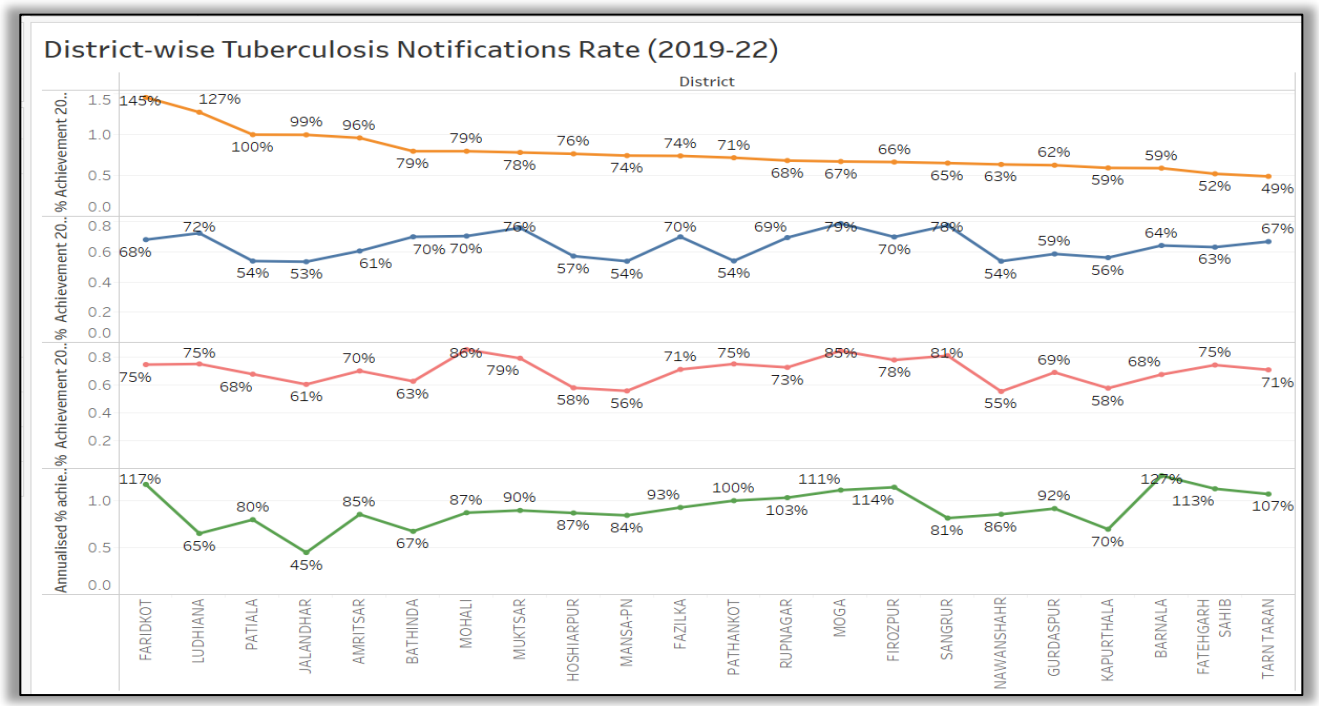

Figure 5: District-wise TB Notifications Rate of Punjab of the period 2019-22 at a glance in Tableau.

Observation: We can see that the notification rate has uniformly and significantly decreased across district from 2019 to 2020. We can also appreciate the districts with the highest Notification rates and those with the lowest rates across the years. Faridkot shows the best testing rates followed by Ludhiana and Patiala while Fatehgarh Saheb and Tarn Taran have the lowest notification rates per lakh population. The trend shows slight recovery in the year 2021 and the rates are further expected to improve in the year 2022 for each district.

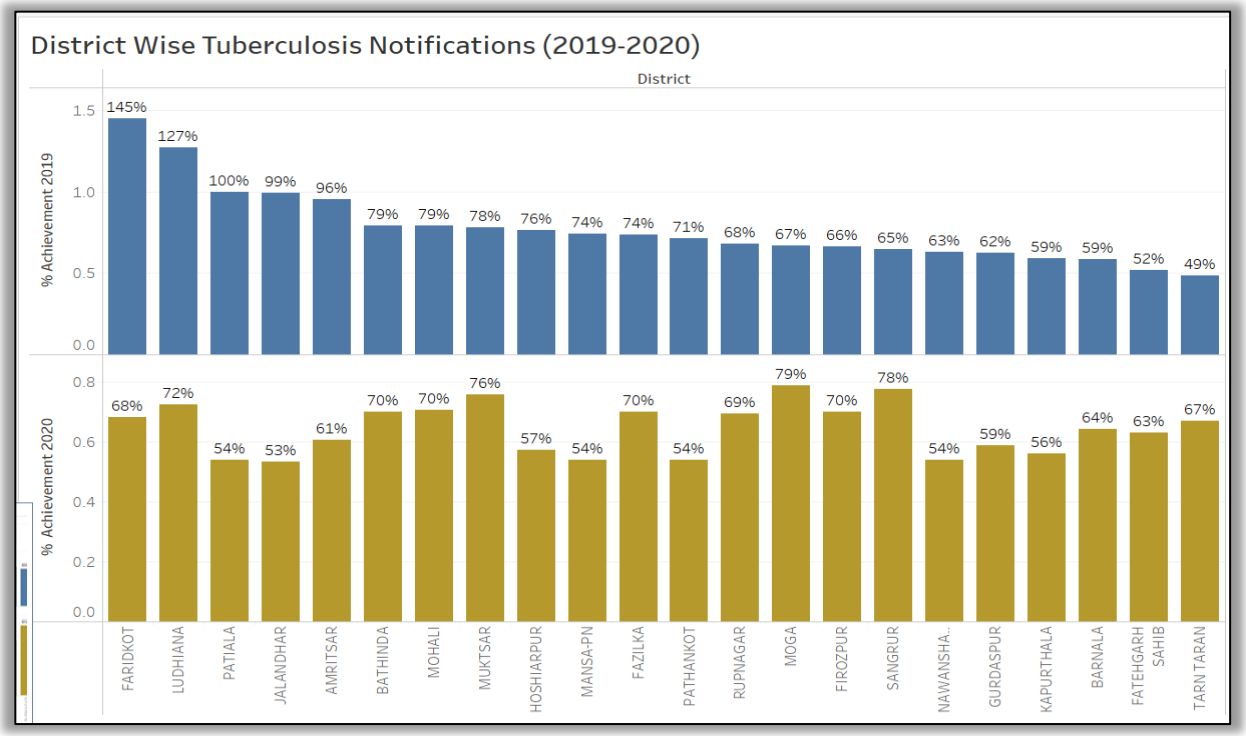

Figure 6: Comparison of district-wise TB Notifications in 2019-2020 in Tableau.

Observations: As we can see, all the districts have a decreasing trend of notifications rate in the year 2020 when it was the time of first covid wave and a country wide lockdown. districts like Rupnagar, Moga, Firozpur, Sangrur, Barnala, Fatehgarh Saheb and Tarn Taran have an increasing trend of notifications.

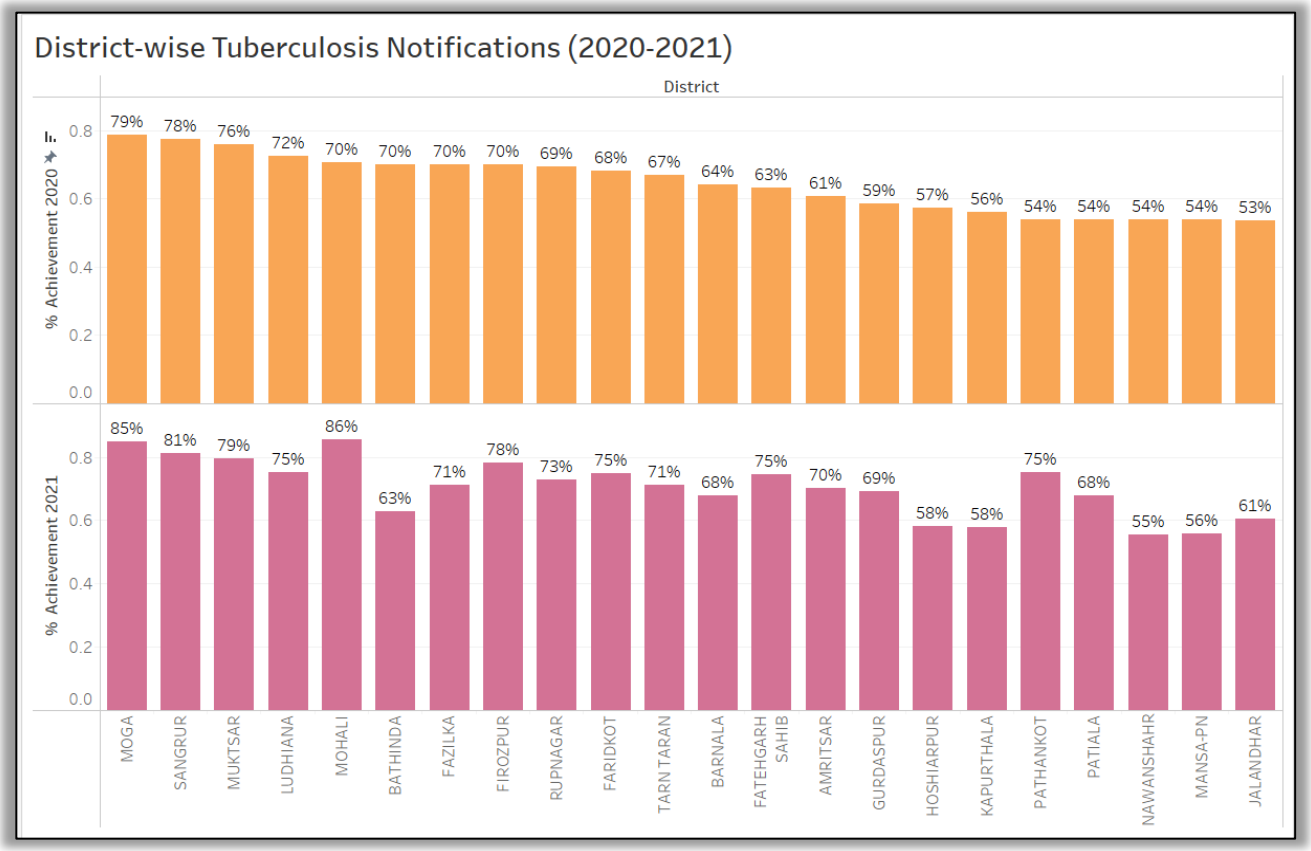

Figure 7: Comparison of district-wise TB Notifications in 2020-2021 in Tableau

Observations: We can well establish the decreasing trend of TB notifications of all the districts against their respective targets in the year 2020 and a trend of recovery in 2021.

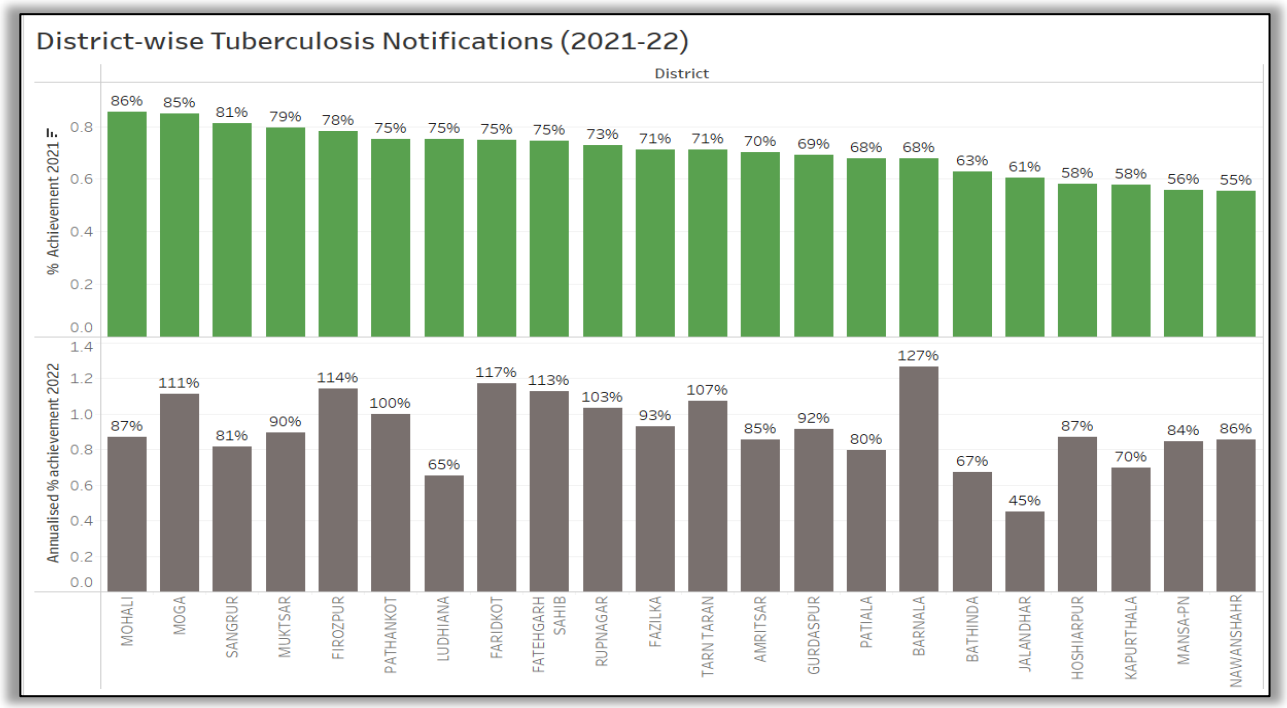

Figure 8: Comparison of district-wise TB Notifications in 2021-2022 in Tableau

Observation: The notification rates have improved significantly in the year 2022 except for the districts of Ludhiana and Jalandhar.

4.3 Outcome Indicators:

NOTE:

1. The following outcome indicators are calculated for the cohort of 2021.
   Reason: Treatment of drug sensitive TB usually lasts for six months or can be extended up to further two months as per the clinician's assessment and patient's need. Therefore, for instance, most of the patients who were initiated with the treatment from January to September 2021 would have completed the regime as of now. Those who were initiated in the fourth quarter of 2021 and in 2022 would still be on treatment. Therefore, the outcome indicators could only get assessed until the year 2021 and the year 2022 is excluded from the analysis.
2. The data for the year 2021 is available up to the first three quarters for outcome indicators. Therefore, for the ease of analysis, the data of the year 2021 has been annualized.0

a) Default Rate: The indicator measures the number of affected/notified individuals who have been lost to follow up.

It is calculated as = (People lost to follow up)/ (Total Notified people) * 100

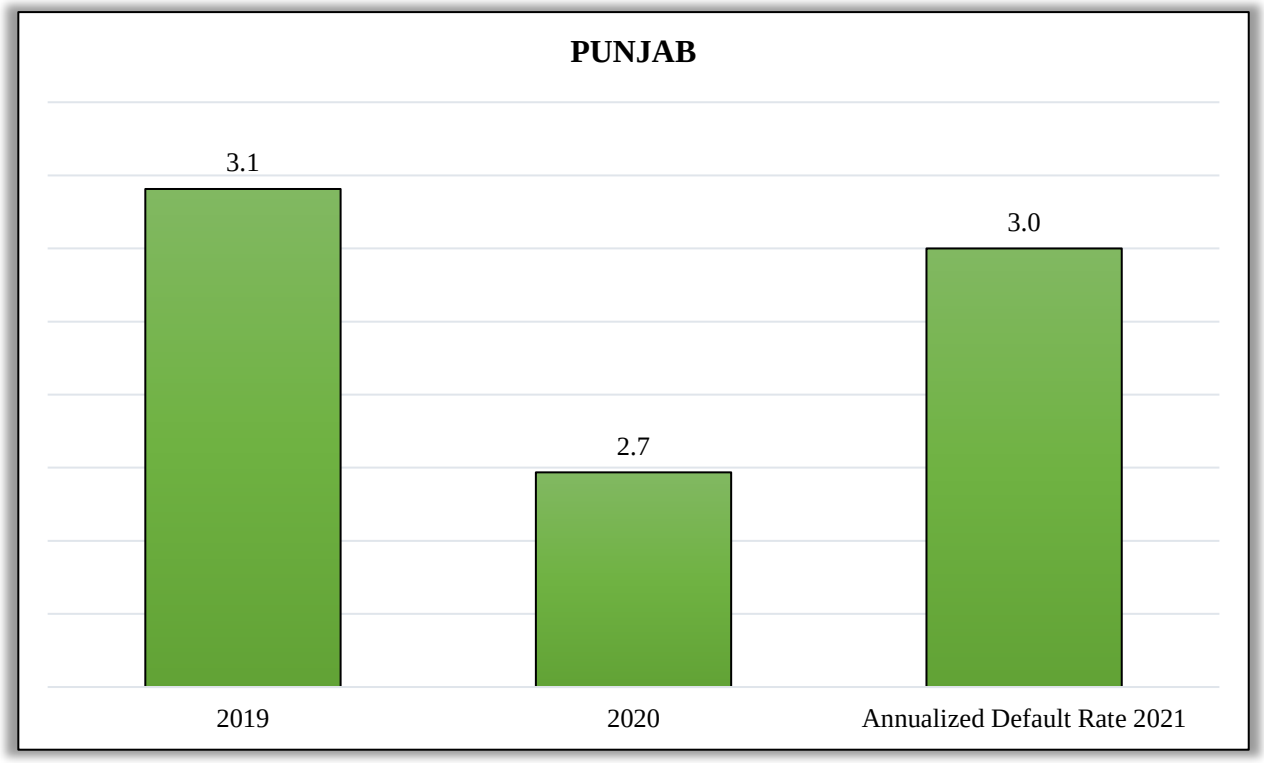

Figure 9: Broad Overview of default rate in the state of Punjab over the period of (2019-21)

Observation: We can appreciate the decrease in default rate over the year 2020. This could be corelated to a better adherence monitoring system by the NTEP staff but would need further research and reason analysis for the same.

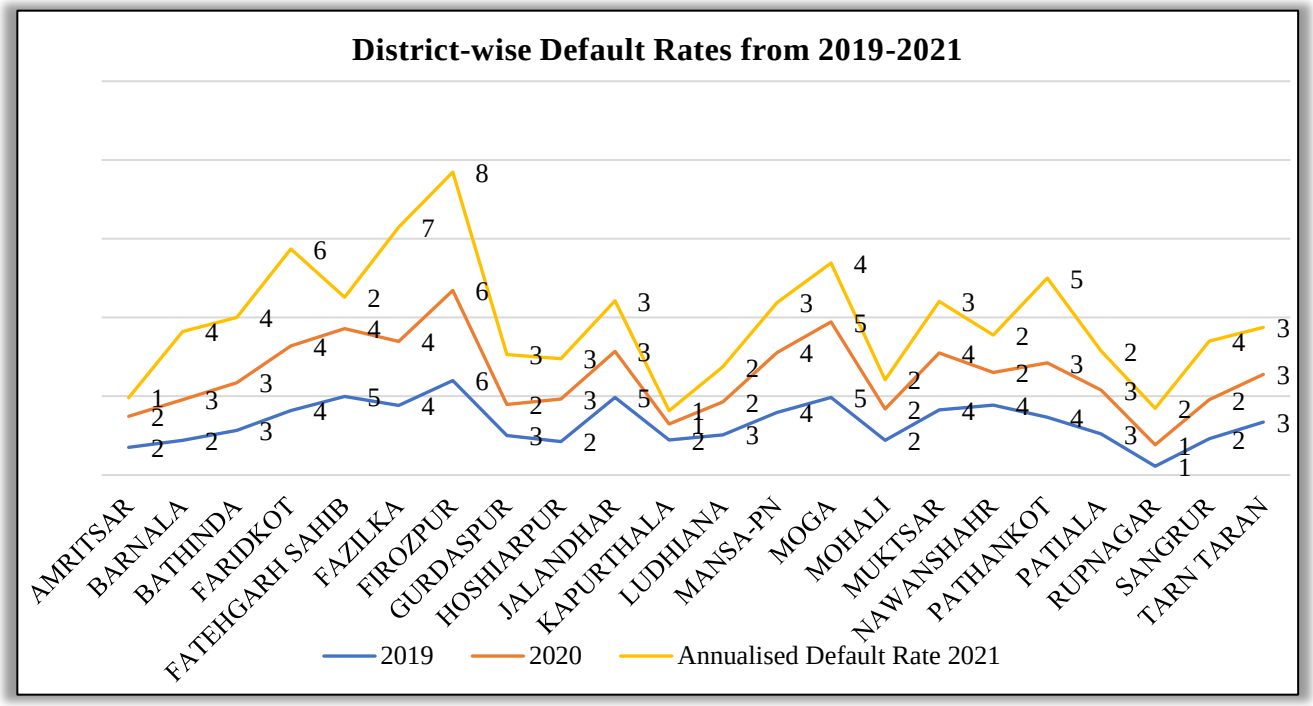

Figure 10: District wise comparison of default rate in the period (2019-21)

Observation

Most of the districts have shown either a consistent or decreased trend in the default rates over the years 2019 and 2020 except for Hoshiarpur. However, districts like Barnala, Bathinda, Faridkot, Fazilka, Firozpur, Pathankot, Sangrur and Rupnagar (2021) have slightly increased default rates in the year 2021.

b) Death Rate:

The indicator means to know about the total deaths occurred amongst the total notified people whether with or without the treatment initiation.

It is calculated as = (Total people died after treatment initiation+ total people died without treatment initiation)/ Total Notified * 100

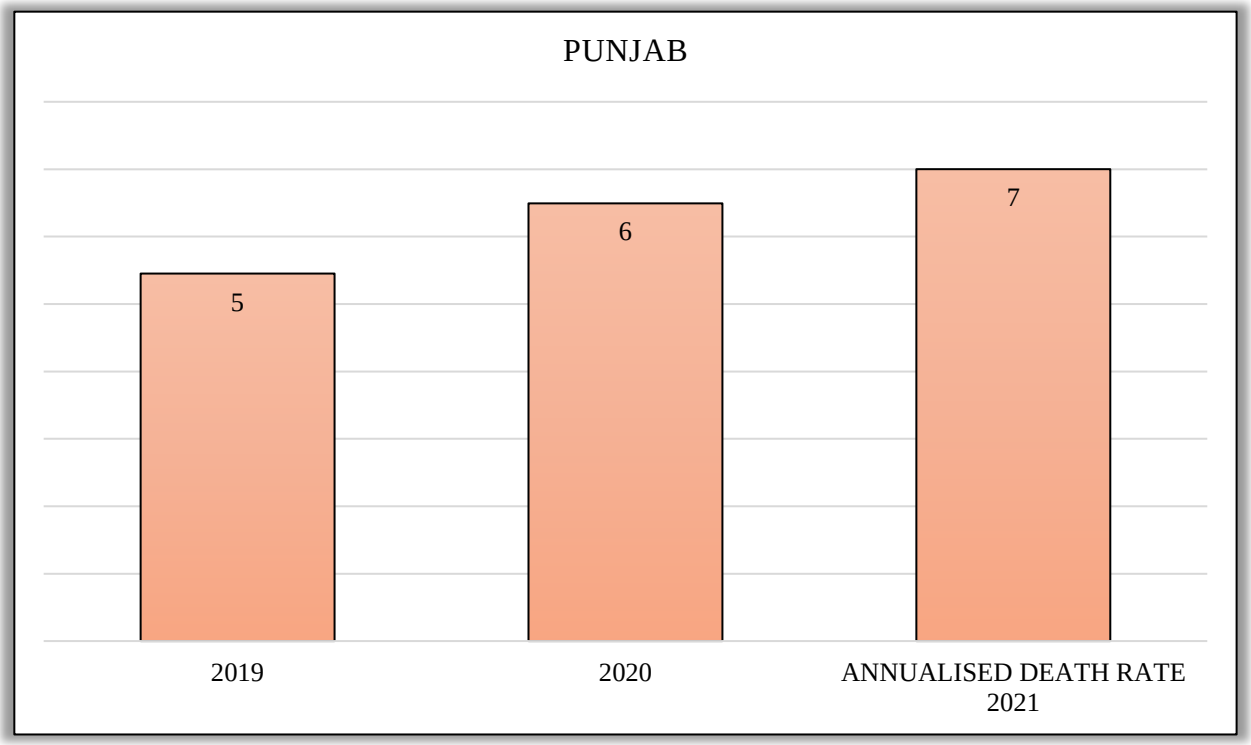

Figure 11: Broad overview of Death Rates in the state of Punjab over the time period (2019-21)

Observation: We can appreciate the death rate increasing in the year 2020 and 2021.

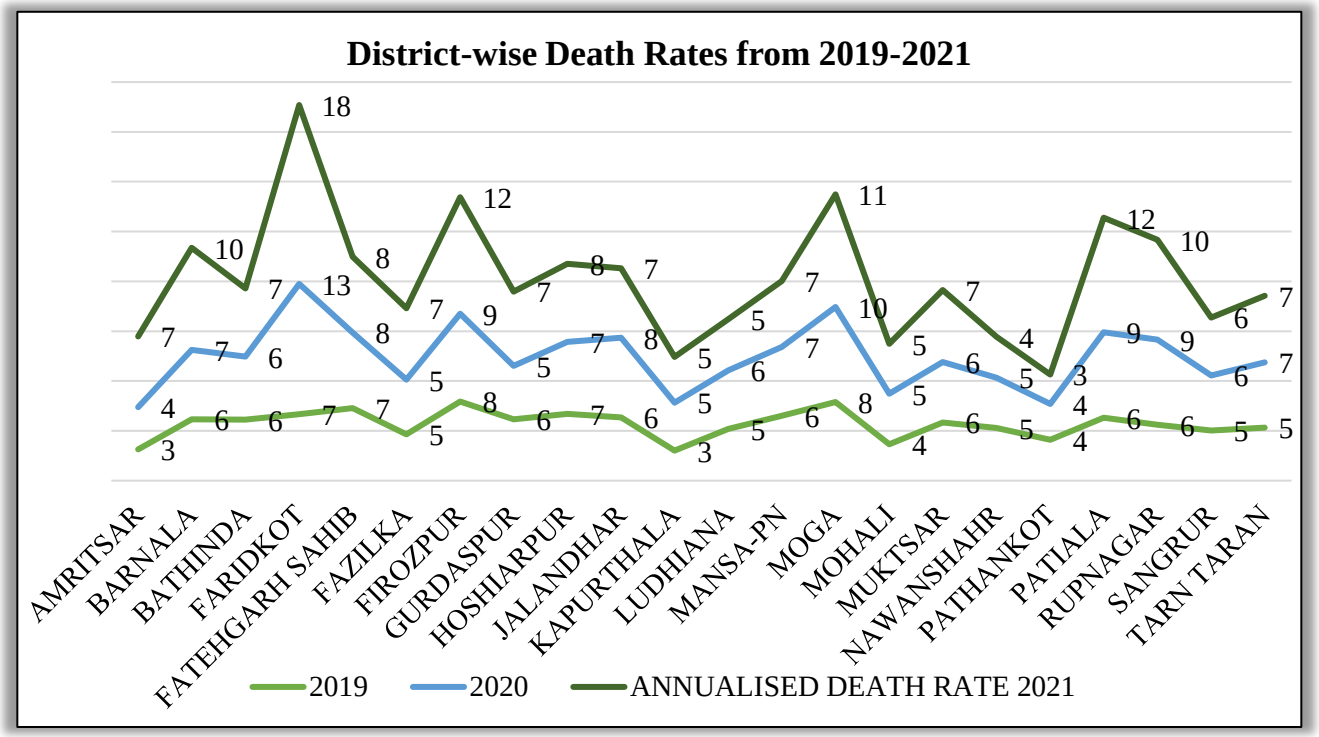

Figure 12: District wise comparison of Death rates in the time period (2019-21)

Observation: The death rates have shown increasing or consistent trends over the years 2020 and 2021.

c) Treatment Success Rate:

The indicator measures the percentage of drug sensitive TB patients that are successfully cured with a negative follow up report at the end of the treatment or follow up report is not available, but it has been established that the patient has taken the due course of treatment and the required number of drug dosages.

It is calculated as

= (Number of drug sensitive registered TB patients who have been completed treatment and cured)/ Number of drug sensitive registered TB patient over a specific time period * 100.

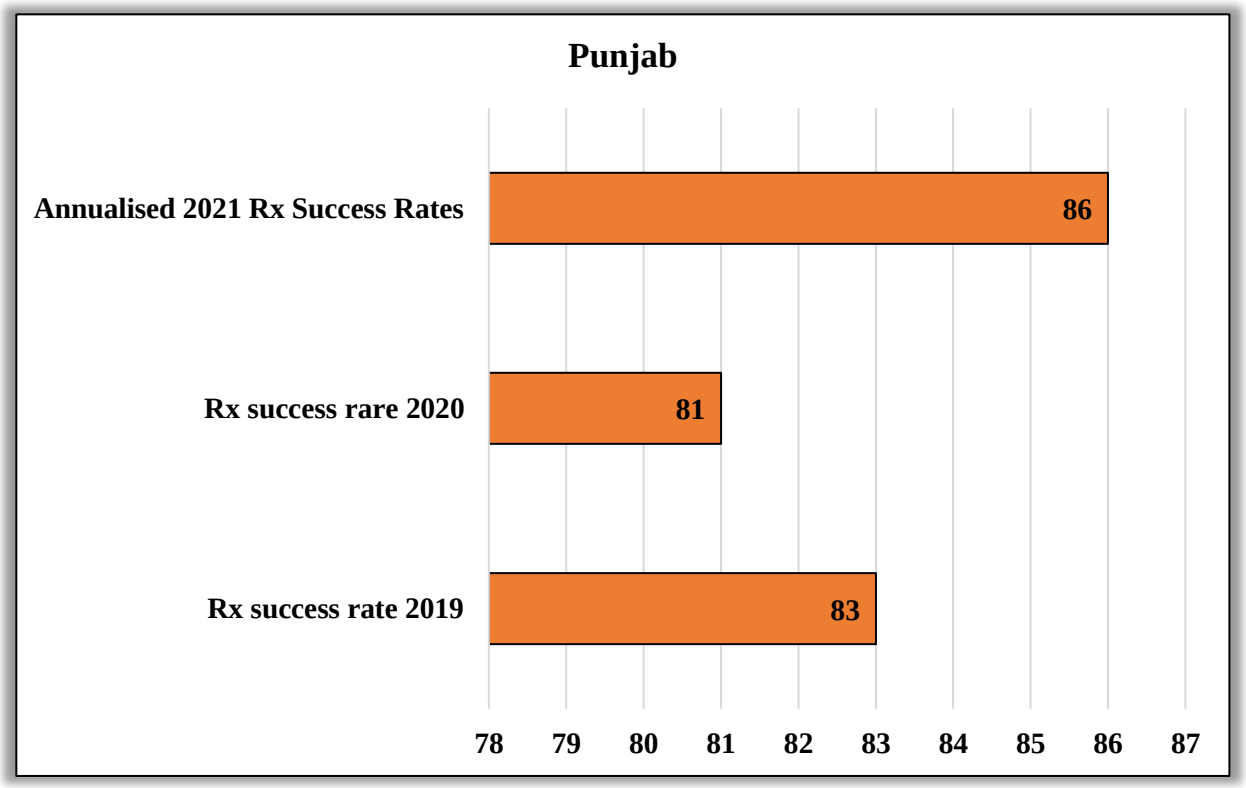

Figure 13: Broad overview of Treatment success rates in the state of Punjab in the time period (2019-21).

Observation: We observe a decreasing trend in the overall treatment success rates in the state of Punjab in the year 2020 and increasing in the year 2021.

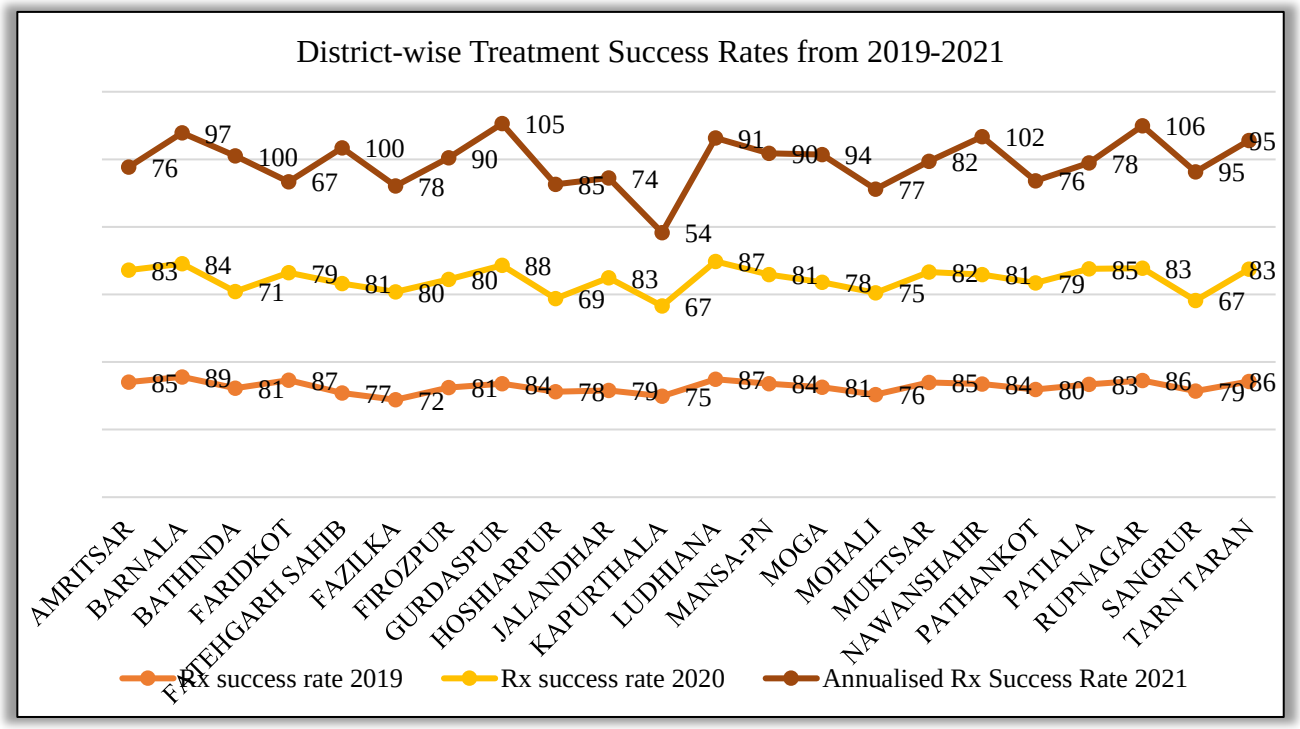

Figure 14: District Wise comparison of Rx Success rates in the time period (2019-21)

Observation: Trends show increased treatment success rate in the year 2022. Probable reasons could be the better monitoring of indicators from state and district level and repurposing of existing HR. Hence pending data entries are also being completed.

CHAPTER 5: DISCUSSION

The aim of the study is to understand the impact of Covid-19 pandemic on the Tuberculosis notifications in the time period of four years 2019-2022 in the state of Punjab.

Presumptive TB examinations rates has a proportional relationship with rate of Tuberculosis notifications. In the pre-covid time, a directly proportional relationship can be well appreciated between the two indicators as seen as follows:

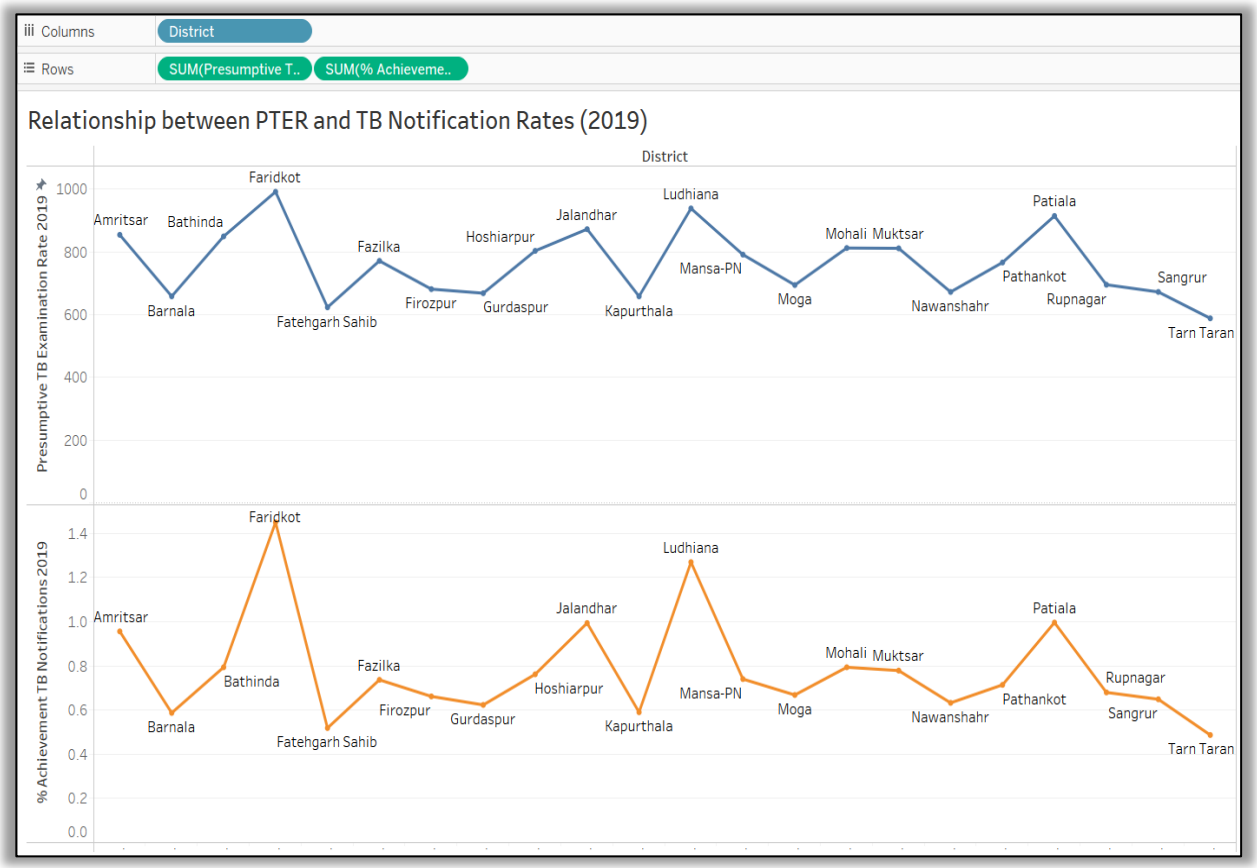

Figure 15: Relationship between PTER and TB Notifications Rate district wise in 2019.

However, in the year 2020, the relationship is no longer proportional during the first wave of covid-19 pandemic and a country wide lockdown.

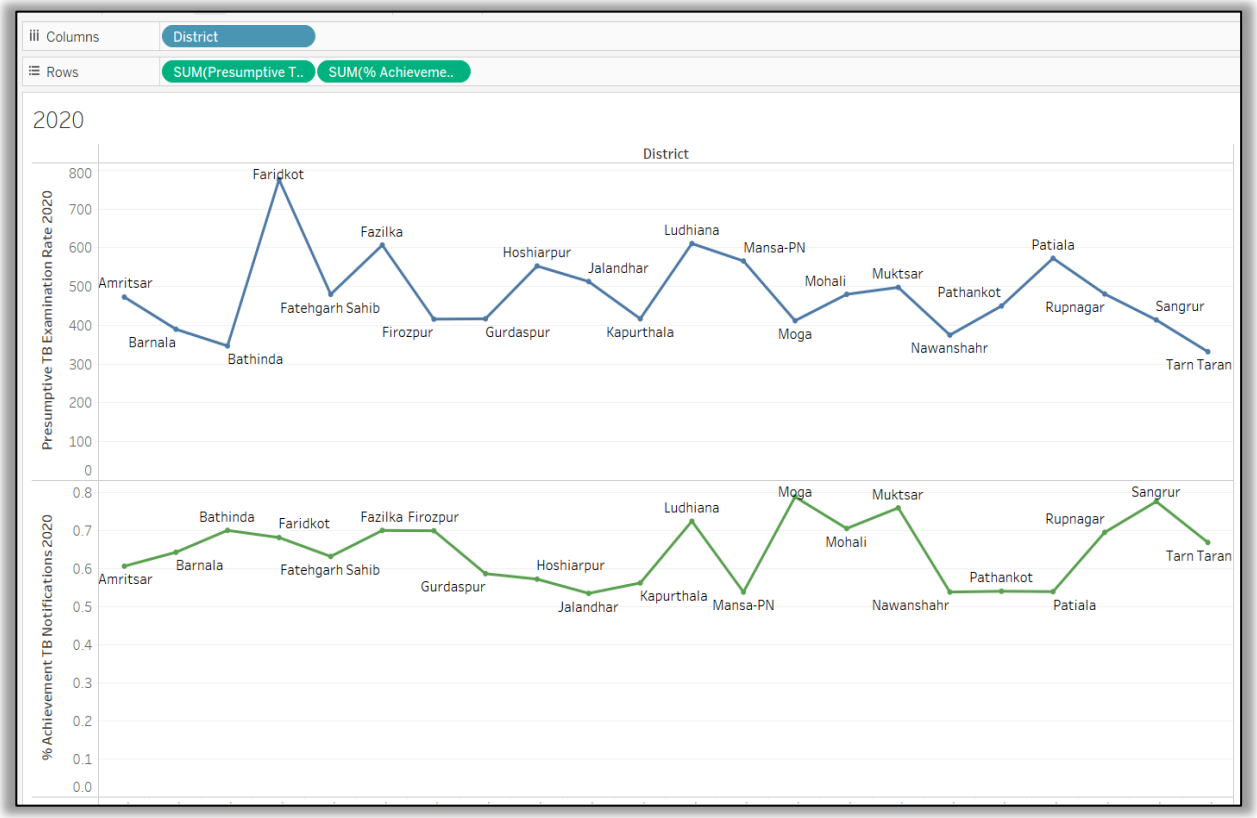

Figure 16: Relationship between PTER and TB Notifications Rate district wise in 2020.

Reasons are:

- Decreased general OPD patients leading to decreased diagnosis of Tuberculosis.
- Only patients who were with symptoms presented themselves for screening and testing and ultimately tested positive for TB.
- Selective referral of presumptive TB patients by medical officers leading to decreased testing and increased positivity.
- The human resources available at healthcare facilities were directed towards the management of the pandemic, hence NTEP faced a severe shortage when the covid-19 pandemic was continuing to rise. This led to linking of the decreased TB notifications with the increased impact of covid-19 pandemic.

In 2021 and 2022, however, the previous relationship of direct proportionality is recovered to a certain extent when it was the time of a deadlier second wave of covid.

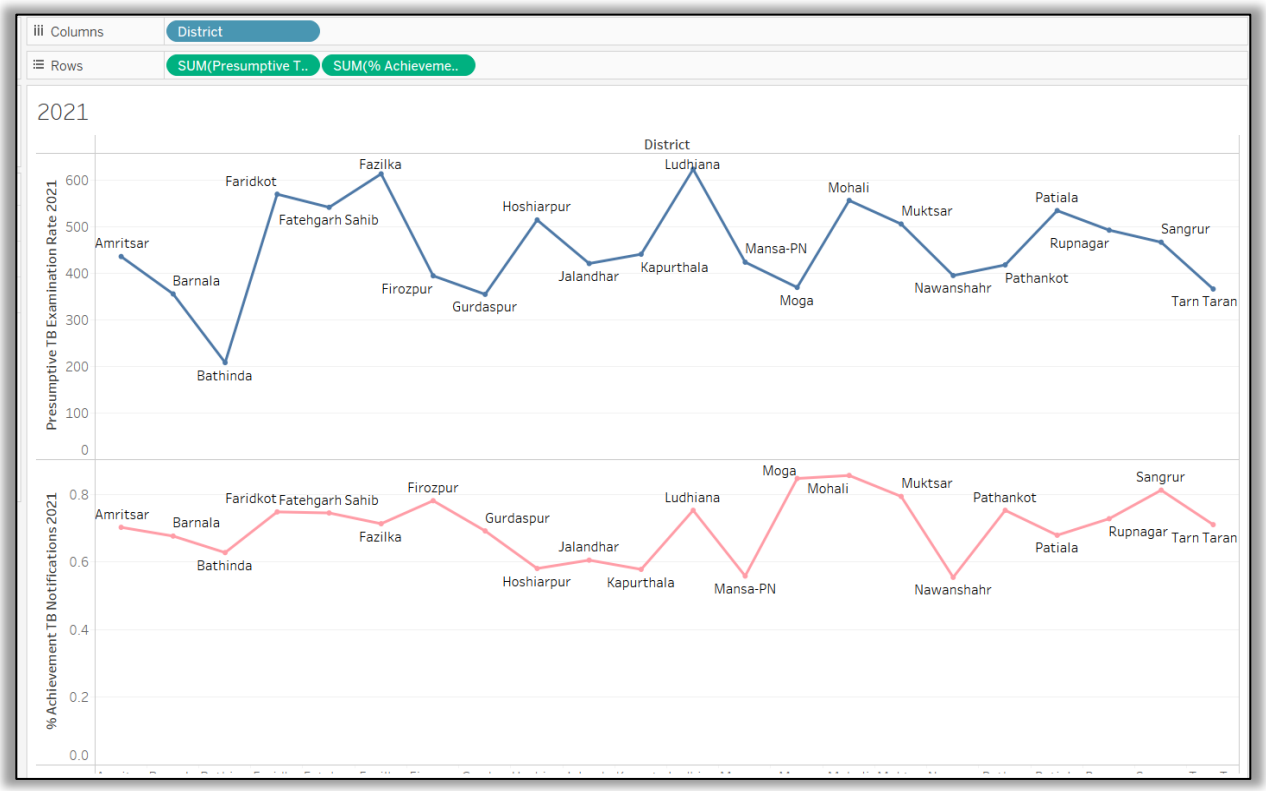

Figure 17: Relationship between PTER and TB Notifications Rate district wise in 2021

Reasons for recovery:

- Improvement in machinery and infrastructure
- Bidirectional screenings have been conducted
- ACF rounds were conducted
- Private sector showed a major extent of recovery in 2021-2022.
- In 2021, there were no COVID waves from the months from January – March and July-December, and during this period, hospitals were fully opened and working at comparatively better capacities, functional OPDs and better private sector engagement.

Also, in 2020, the default rates were consistent because of

- COVID-19 pandemic and country wide lockdown and contact tracing could not be performed accurately.

Even in 2021, although the overall default rates remained same, some of the districts showed an increase

- because the hospitals had resumed functioning and there was a severe shortage of staff.

The COVID-19 pandemic has reversed years of global progress in tackling tuberculosis and for the first time in over a decade, TB deaths have increased, according to the World Health Organization's 2021 Global TB report.

In 2020, more people died from TB, with far fewer people being diagnosed and treated or provided with TB preventive treatment compared with 2019, and overall spending on essential TB services falling.

- The first challenge is disruption in access to TB services and a reduction in resources. Human, financial, and other resources have been reallocated from tackling TB to the COVID-19 response, limiting the availability of essential services.
- The second is that people have struggled to seek care in the context of lockdowns.

TB services are among many others disrupted by the COVID-19 pandemic in 2020, but the impact on TB has been particularly severe.

CHAPTER 6: RECOMMENDATIONS:

Punjab faces the following main challenges in the program implementation:

- Lack of Human Resources at required locations.
- Lack of data entries.
- Lack of adequate funds and
- Lack of adequate consumables and efficiently functioning lab equipment.

Based on the challenges, the recommendations are:

- Recruitment of Human Resources at priority.
- Gap analysis of the workload to be done for all the posts.
- Rationalisation of manpower may be needed to be done.
- Release of adequate funding from Central TB Division (CTD)

- Arranging the adequate consumables from the state PHSC.

Further,

Death audits must be necessary and should be regularly monitored by the highest authorities. The process has already begun in the state.

CHAPTER 7: CONCLUSION

Tuberculosis (TB) is a major cause of death globally. India carries the highest share of the global TB burden. The COVID-19 pandemic has severely impacted diagnosis of TB in India, yet there is limited data on how TB case reporting has changed since the pandemic began and which factors determine differences in case notification.

Despite concerted efforts driven mainly by the United Nations sustainable development goals, the WHO's End TB Strategy and the Government of India's National Strategic Plan to eliminate TB by 2025, the incidence of TB has been declining slowly. Risk factors such as poverty, low socioeconomic status, malnutrition with impaired immunity, poor housing and inadequate ventilation were significantly associated with developing latent TB and active case conversion.

As a result of current shifts in economic and political priorities towards COVID-19 containment, it is a contention that national efforts to tackle TB are likely to be adversely affected. In terms of economic impact, an estimated 140 million Indian people have already lost their jobs during the current crisis. Lost earnings have been particularly harmful to the most marginalized and impoverished communities, bolstering poverty and malnutrition further, both of which are major risk factors that predispose to TB in rural and urban communities. As India continues to battle the coronavirus pandemic, the current lockdown is already leading to debilitating effects on TB services, with limited access to healthcare and anti-tuberculous drugs as well as disruption of treatment services. The Stop TB Partnership modelling analysis has assessed the potential effects of lockdown on TB incidence and mortality over the next 5 years in high-burden settings. In the case of India, lockdown has resulted in a striking 80% reduction in TB notification rates.

Talking specifically about the state of Punjab, the state was significantly hit by the COVID-19 pandemic. During the course of this study, the indicators under consideration showcase the impact of covid-19 on TB Notifications in the said time period. Every indicator showed a decreasing trend in the year 2020 and slight recovery and improvement trend in the year 2021and 2022.

PTER and TB notifications have followed a trend of proportionality in 2019 but it changed in the years 2020 and 2021 when the pandemic hit the state. The rates have improved in the year 2021 for majority of the districts even during the deadlier time of second wave. However, Bathinda is an exception as its rate has further decreased in the year 2021. Probable reason is Bathinda has a large private sector but no supporting agency. During covid the notifications from private sector decreased further leading to decreased rates.

In 2022, The notification rates have improved significantly except for the districts of Ludhiana and Jalandhar. These are two districts with the largest private sector in the state. Till December 2021, JEET project was supporting the private sector notification in these districts. Now that the project is over, the support has stopped, and the notifications are lagging behind. The state is proposing a PPSA from the domestic budget this year which should help in bringing up the figures again.

Next, the death rates have shown increasing or consistent trends over the years 2020 and 2021. All the deaths occurring in TB patients may or may not have happened due to TB and its complications. Deaths include those due to COVID, cardiac arrest, accidents, HIV, diabetes etc. The state needs to initiate the process of death audits so as to assess the correct causes of deaths in TB patients and find out the preventable causes of death such as access or availability of diagnostic and treatment facilities, delayed health seeking behaviour, comorbidities, malnutrition etc and work towards streamlining activities to prevent those deaths.

Finally, Trends show increased treatment success rate in the years 2021 and 2022 after a decrease in the year 2020. Probable reasons could be the better monitoring of indicators from state and district level and repurposing of existing HR. Hence pending data entries are also being completed.

The state is expected to recover to its pre-covid levels in the year 2022.

Consequently, it is anticipated that a huge number of cases will remain undiagnosed and untreated, further fuelling TB transmission rates among household contacts. It is therefore essential that in addition to the restoration of normal TB services, supplementary measures are instigated, with a focus on reducing the prevalent pool of TB in endemic settings. Such measures may involve a combination of intensive community engagement, maintaining awareness of the importance of TB services and enhanced active case-finding efforts, including rapid scaling up of contact tracing where possible to compensate for missed diagnoses imposed by the lockdown. Additional innovative approaches such as the use of digital technology and other tools will be encouraged.

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ANNEXURE:

The following datasets were extracted from the NIKSHAY portal for data analysis:

1) **PTER:**

State/District	Presumptive TB Examination Rate 2019	Presumptive TB Examination Rate 2020	Presumptive TB Examination Rate 2021	Annualised PTER 2022(Q1)
Amritsar	803	553	515	546
Barnala	623	480	542	652
Bathinda	766	450	418	591
Faridkot	938	611	623	839
Fatehgarh sahib	914	573	535	499
Fazilka	672	414	467	591
Firozpur	658	417	441	608
Gurdaspur	694	412	370	394
Hoshiarpur	791	566	424	492
Jalandhar	681	416	395	456
Kapurthala	672	375	395	378
Ludhiana	811	498	506	496
Mansa-pn	849	347	208	350
Moga	668	417	355	427

Mohali	771	607	613	738
Muktsar	695	481	493	565
Nawanshahr	658	390	356	414
Pathankot	812	480	556	698
Patiala	872	513	421	491
Rupnagar	991	776	570	597
Sangrur	854	473	436	340
Tarn taran	588	332	366	502
Punjab	**760**	**480**	**448**	**517**

2) Death Rate:

State/District/TB Unit	Death Rate 2019	Death Rate 2020	Annualised Death Rate 2021
Amritsar	3	4	7
Barnala	6	7	10
Bathinda	6	6	7
Faridkot	7	13	18
Fatehgarh sahib	7	8	8
Fazilka	5	5	7
Firozpur	8	9	12
Gurdaspur	6	5	7
Hoshiarpur	7	7	8
Jalandhar	6	8	7
Kapurthala	3	5	5
Ludhiana	5	6	5
Mansa-pn	6	7	7
Moga	8	10	11

Mohali	4	5	5
Muktsar	6	6	7
Nawanshahr	5	5	4
Pathankot	4	4	3
Patiala	6	9	12
Rupnagar	6	9	10
Sangrur	5	6	6
Tarn taran	5	7	7
Punjab	**5**	**6**	**7**

3) Default Rates:

State/district/tb unit	Default Rate 2019	Default Rate 2020	Annualised default rate 2021
Amritsar	2	2	1
Barnala	2	3	4
Bathinda	3	3	4
Faridkot	4	4	6
Fatehgarh sahib	5	4	2
Fazilka	4	4	7
Firozpur	6	6	8
Gurdaspur	3	2	3
Hoshiarpur	2	3	3
Jalandhar	5	3	3
Kapurthala	2	1	1
Ludhiana	3	2	2
Mansa-pn	4	4	3
Moga	5	5	4
Mohali	2	2	2
Muktsar	4	4	3
Nawanshahr	4	2	2

Pathankot	4	3	5
Patiala	3	3	2
Rupnagar	1	1	2
Sangrur	2	2	4
Tarn taran	3	3	3
Punjab	**3**	**3**	**3**

4) Treatment Success Rates:

State/District/TB Unit	Rx success rate 2019	Rx success rate 2020	Annualised Rx Success Rate 2021
Amritsar	85	83	76
Barnala	89	84	97
Bathinda	81	71	100
Faridkot	87	79	67
Fatehgarh sahib	77	81	100
Fazilka	72	80	78
Firozpur	81	80	90
Gurdaspur	84	88	105
Hoshiarpur	78	69	85
Jalandhar	79	83	74
Kapurthala	75	67	54
Ludhiana	87	87	91
Mansa-pn	84	81	90
Moga	81	78	94
Mohali	76	75	77
Muktsar	85	82	82
Nawanshahr	84	81	102
Pathankot	80	79	76
Patiala	83	85	78

Rupnagar	86	83	106
Sangrur	79	67	95
Tarn taran	86	83	95
Punjab	**83**	**81**	**86**

5) TB Notifications:

District	% Achievement 2019	% Achievement 2020	% Achievement 2021	Annualised % achievement 2022
Amritsar	96%	61%	70%	85%
Barnala	59%	64%	68%	127%
Bathinda	79%	70%	63%	67%
Faridkot	145%	68%	75%	117%
Fatehgarh sahib	52%	63%	75%	113%
Fazilka	74%	70%	71%	93%
Firozpur	66%	70%	78%	114%
Gurdaspur	62%	59%	69%	92%
Hoshiarpur	76%	57%	58%	87%
Jalandhar	99%	53%	61%	45%
Kapurthala	59%	56%	58%	70%
Ludhiana	127%	72%	75%	65%
Mansa-pn	74%	54%	56%	84%
Moga	67%	79%	85%	111%
Mohali	79%	70%	86%	87%
Muktsar	78%	76%	79%	90%
Nawanshahr	63%	54%	55%	86%
Pathankot	71%	54%	75%	100%
Patiala	100%	54%	68%	80%

Rupnagar	68%	69%	73%	103%
Sangrur	65%	78%	81%	81%
Tarn taran	49%	67%	71%	107%
Punjab	**88%**	**64%**	**70%**	**78%**

THANK YOU!