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Original Research Article

Effects of COVID-19 on national tuberculosis elimination programme strategies during March to May 2020 on Tumkur district, India

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ABSTRACT

Background: the nation-wide lockdown due global pandemic has disrupted a vital strategic intervention resulting in overall 60% decrease in presumptive and diagnostic TB cases during the lockdown period.

Methods: A discrete choice experimental (DCE) exploratory operational research conducted during March to May 2020.

Results: Health care services were affected 25% reduction in the outpatient department (OPD) in comparison to the previous year the same period. A gradual reduction in negative sputum cases undergoing chest radiography from 54% to 14%. Due to restricted movement LPA tests have been reduced 25% among the diagnosed TB cases, and private referrals to cartridge based nucleic acid amplification test (CBNAAT) services were reduced to 20%.

Conclusions: Health services, including national programmes to combat TB, need to be actively engaged in ensuring an effective and rapid response to COVID-19 while ensuring that TB services are maintained. 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.

Keywords: National tuberculosis elimination program, COVID-19, Pandemic, Tuberculosis

INTRODUCTION

India had made significant advancement till March 24th 2020 towards the goal of end TB elimination and then the nation-wide lockdown due global pandemic has disrupted a vital strategic interventions resulting in overall 60% decrease in presumptive and diagnostic TB cases during the lockdown period.¹ This may not only impact on morbidity and mortality due to TB, also enhance the active transmission in household contact. The COVID-19 pandemic has placed un-precedented demands and pressure on the health system.

Indian healthcare delivery system

The national health mission (NHM) is a major instrument of financing and support to the States to strengthen public health systems and healthcare delivery. The private sector provides majority of secondary, tertiary and quaternary care institutions with a major concentration in metros, tier I and tier II cities.² Health facilities and workforce are diverted and assigned a wide variety of activities related to controlling the outbreak hence, the present study is designed to determine the implications of COVID-19 on tuberculosis diseases control strategies. This is a critical

requirement for evaluating the effectiveness of preventive interventions and for tracking progress.

METHODS

The study was conducted in the Tumkur district administration of Karnataka, India, from March 2020 to May 2020.

Study design

The present study was a DCE exploratory operational research.³

Qualitative pretested open-ended questions were used to collect free-text comments from peripheral health professionals. Followed by qualitative data think-aloud conceptual basis virtual one to one telephonic conversation was done to collect the data, by predefined data variables and end of conversation debriefing questions, and the answers were done to overcome the recall bias.⁴

Settings

The study was conducted at the Tumkur district of Karnataka (2.9 million) from March 2020 to August 2020. The district was implementing PMDT since 2011.⁵ For national tuberculosis elimination program (NTEP) implementation, the district is further sub-divided into tuberculosis units (TU; for every 2.5 million population). The program has established one designated microscopy center (DMC) for every 0.1 million population where the laboratory technicians are trained for sputum smear examination, and the laboratories are quality assured. The district has primary health centers (PHC) for every 0.03 million population, and the DMCs are located at one of these PHCs. The district of Tumkur has 12 TUs with 34 DMCs and 3 CBNAAT sites, the district did not have any DST sites, and the samples were transported to the places outside the district (Nearest DST lab Bangalore).

The qualitative data were obtained from the key informant interviews (KIIs) of seven national tuberculosis elimination program staff of different cadres and five paramedical staff of different cadres involved in national tuberculosis elimination program implementation. The KIIs were conducted through virtual mode in local vernacular language (Kannada) at a time and place convenient to them after taking a prior appointment. Each interview lasted for 8-10 minutes, and all the participants were purposively selected.

Study population, sources of data and data collection

The data were extracted from the laboratory registers maintained at DMCs drug sensitivity test (DST) registers at CBNAAT sites during March 2020 through the May 2020.

Data variables

Quantitative: The data on sputum smear results, date of diagnosis of drug-sensitive TB, the date referred for DR-TB test, date of pre-treatment evaluation was extracted from registers and reports. (Required data need to be added).

Qualitative: The pandemic challenges on routine care of NTEP and corrective measures, public health initiatives were taken during pandemic were collected from KII of health care professionals.

Data analysis

The data was analysed using EpiData analysis (V2.2.2.182 Odense, Denmark). Descriptive statistics were tabulated in the form of absolute numbers, and differences in percentage. Manual descriptive thematic analysis was performed for qualitative data.

Ethics approval

Ethics approval was obtained from the institutional ethics committee of the ESIC medical college and PGIMSR, Bangalore, Karnataka, India. The study involves the record review; a waiver for informed consent was obtained from the ethics committees. Virtual mode informed oral consent was obtained from stakeholder before interviews.

RESULTS

In ongoing pandemic TB, health care services were affected 25% reduction in the outpatient department (OPD) in comparison to the previous year the same period (i.e., March-May 2019). In all the institutions' PHI's, CHC's, THs, and in DH. Table 1 shows in the pre-pandemic total of 6207 presumptive TB cases were examined in the COVID-19 situation overall 56 % (-2705) presumptive cases were identified. There was a gradual reduction in negative sputum cases undergoing chest radiography from 54% to 14%, but Cough, fever, and cold cases were not referred to DMC. These cases were considered as a suspected COVID infection. Moreover, throat swabs were collected in that health care setup overall 23% case were severe acute respiratory illness (SARI) samples were confirmed/presumptive based on COVID test result and due to restricted movement LPA tests have been reduced 25% among the diagnosed TB cases, and private referrals to CBNAAT services were reduced to 20%. In the diagnostic services of the study district.

In Table 2 comparison to the previous year (i.e., March, April 2019), lost-to-follow and mortality due to TB show a variation in numbers dramatically lost to follow up cases among the diagnosed cases, differing from 9 to 13 %. Mortality rate shows significant variation begins with nine deaths in march in which it comes to 1, but in April, it shows restricted movements might influence 16 deaths due to lockdown, and social anxiety was more evident in the study's provenance.

Table 1: Comparison of the NTEP diagnostic services during a pandemic pre-COVID/during COVID in Tumkur district, Karnataka March to May 2019-20.

Presumptive TB case examination	Pre-COVID	During COVID	Change absolute no.	Change %
Diagnostic				
March	2066	2249	+183	108.85
April	2123	876	-1247	41.26
May	2018	377	-1641	18.68
Total	6207	3502	-2705	56.42
Confirmed +ve subjects				
March	227	90	-137	39.64
April	222	88	-134	39.63
May	221	33	-188	14.93
Total	670	211	-459	31.49
Sputum negative cases tested for chest X-ray				
March	385	209	-176	54.28
April	410	110	-300	26.82
May	459	65	-394	14.16
Total	1254	384	-870	30.62
Sputum samples of SARI cases referred to CBNAAT				
April	27	6	-21	22.22
May	24	6	-18	25.00
Total	51	12	-39	23.52
Sputum samples of ILI cases referred to CBNAAT				
April	72	5	-67	6.94
May	77	3	-74	3.89
Total	149	8	-141	5.36

Table 2: Comparison of the NTEP treatment services during pandemic pre-COVID/during COVID in Tumkur district, Karnataka March to May 2019-20.

Variables	Pre-COVID	During COVID	Change absolute no.	Change %
Lost to follow up cases among the diagnosed cases				
March	22	2	-20	9.09
April	16	2	-14	12.25
May	15	2	-13	13.33
Total	53	6	-47	11.32
Deaths among diagnosed TB cases				
March	33	9	-24	27.27
April	35	16	-19	45.71
May	31	1	-30	3.22
Total	99	26	-73	26.26

DISCUSSION

Qualitative

The challenges perceived by the health professionals and care providers in COVID-19 pandemic and corrective measures taken to the implementation of CDT guidelines were broadly categorized as 1) Diagnostic services, 2) treatment services, 3) Public health action: (1a) challenges are diagnostic services and (1b) Corrective measures taken for diagnostic services (2a) Treatment services and its implementation steps.

Challenges in diagnostic services

DMC technicians are reluctant to do smear for AFB due to the COVID pandemic and lacking of PPE kits, masks, and other safety equipment and till the end of March month. The ASHA's, AW, and other health care professionals were surveying in COVID affected areas and adjoining buffer zones, and they are reluctant to collect the sputum samples. Furthermore, they expressed their apprehension due non defined guidelines in collecting samples from home care services, in turn, they refer ILI (Influenza like illness) and SARI (severe acute respiratory illness) to

health care setup (government hospitals) for throat swab testing.

Due to the applicability of restricted movements in the nation, the courier services were affected, transporting sputum samples to IRL labs for LPA testing were made available through alternative mode.

Private practitioner's (PP) health care setup was closed according to the government guidelines during this period. From March 1st, 2020 onwards 50% through the first case was identified March 25th, of the PP's, are opened the hospitals and clinics were not seeing the fever and cough cases directly referred to public health institutions.

Corrective measures: have taken to identify presumptive cases and case detection of TB pandemic with following standard operating guidelines (SOP) for DMC and sputum collection center were prepared on par with CTD guidelines, to take safety measures during corona pandemic (Annexure 1).

The sample handler PPE kit, masks, face shields, gloves, sanitizers, and sodium hypochlorite solutions were provided, including DMC's. Re-routed all the collected samples from the DMC's to CBNAAT sites (3 CBNAAT sites) and were transported through the vehicles which were carrying COVID-19 specimen to district headquarters in the separate package by following standard practice along with demarcation remarks to differentiate samples from COVID like covering with cupboard box, mentioning postal address, defining contact person details along with a mobile number. The vehicle carrying COVID-19 specimen to state headquarters and sputum samples was also sent to ILR, Bangalore, for the LPA.

ILI and SARI cases line list was prepared during throat swab collection, and after getting COVID negative results, sputum samples were collected and transported to the CBNAAT site. Subjecting to x-ray after COVID-19 negative ILI cases, it was a daunting task to bring back patients due to the non-availability of transportation as there was restricted movement, only town area patients are subjected for a chest x-ray. All SARI cases were admitted in the district hospital to collected sputum samples, and samples were transported to the CBNAAT site through TBHV's.

Treatment services and its implementation steps

As per CTD guidelines issued in March concerning the advance distribution of fixed-dose combination (FDC) for two months to ongoing treatment cases, we from the Tumkur district immediately into action. Stocks were made available adequately during the lockdown period.⁶ Peripheral healthcare workers and community health workers (STS, STLS, and TBHV's) were visiting TB patients' homes and providing home care services. STLS were sensitized through phone calls and virtual meetings

to collect follow-up sputum samples from the patient's house regularly, and samples were transported to respective DMCs for follow-up smear examination. During the community visit, NTEP staff were doing primary contact tracing of households of ongoing treatment subjects. NTEP staff was ensured monthly DBT transfer to TB patients during the lockdown period and by confirming through a phone call to the subject whether the amount was credited to their account or not. Though case detection was low in lockdown period through the utilization of contact tracing mode case detection, existing subjects were followed up to enhance detection and monitoring services of NTEP.

By effortful assurance, community health care workers were made to take care of their health to ongoing treatment subjects, along with strict adherence to the home quarantine. Furthermore, sanitized to self-vigilant about day to day activities of the family members and educated on health care seeking behavior during pandemic lockdown period since March, it is an ongoing process, with these local efforts bacilli transmission might reduce and diseases conversion rate will decrease in coming years. We are hoping the TB disease transmission dynamic will significantly reduce by following national pandemic control instruction like wearing masks, social distancing, and practicing cough etiquette, which was laid down by central governance. by and large, we are progressing towards the eradication of tuberculosis.

Public health action has done during corona pandemic

From April onwards, NTEP staff were preparing list 50 subjects daily for tele-healthcare services such as a telephonic call to the subject on COVID symptoms like fever, cough, cold, throat pain, and breathlessness, which are similar to TB symptoms and made awareness to the healthcare-seeking behavior during a pandemic. Efforts were made to install the "Arogya Sethu" application to the subject mobile by the community health workers and educating their uses for COVID related information each individual in there defined health care setup. With the association of NTEP, staff fund rose to distribute food grains and groceries worth of 500 rupees to each needy subject. Fund was pooled from salary on voluntary willingness in societal concern, and it includes district program manager salary.

The district program manager conducted virtual meetings through social media platforms to create awareness about pharmacovigilance and usage of adverse drug reaction reporting. Pharmacovigilance program (PvPI) application to the community health worker by them sensitized TB infected subjects regarding side effects (Adverse drug reaction), and they can report directly to the national toll-free number. With these efforts, we are heading towards minimizing under-reporting of adverse drug reaction (ADR) and trying to contribute to establishing evidential documentation of adverse effects.

CONCLUSION

Health services, including national programmes to combat TB, need to be actively engaged in ensuring an effective and rapid response to COVID-19 while ensuring that TB services are maintained. 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.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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Annexure

Standard operating procedures for DMC and sputum collection centers

Good laboratory practices and universal safety precautions

1. Washing hands with soap and water after collecting, receiving and testing specimens.
2. No eatables and drinking braveries allowed inside the laboratory.
3. Access will be restricted inside the laboratory other than lab technologist.
4. If more than one technician posted is posted in laboratory, distance between the personnel must be maintained.
5. The working surfaces must be made free of organic matter with the help of 1% sodium hypochlorite and large amount of folded absorbent paper. This should be followed by disinfection of work surfaces using 1% sodium hypochlorite, allowing 10-20 minutes contact time with sodium hypochlorite.
6. Work should be started only after the surface is completely dried, this exercise should be repeated twice in a day (before the start and after completion of the day's work).
7. Laboratory technologist must wear the following personal protective equipment (PPE) while handling specimens:
 - a. Disposal N95 respirators (mask), b. Disposable apron/surgical gown/normal apron covered with plastic sheet (disposable/autoclavable/disinfected with hypochlorite),