ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 9, Issue – 2, March – 2024 , Page No. : 51 – 59

Telemedicine in Resource Limited Settings to Optimize the Early Diagnosis of Pulmonary Tuberculosis in Rural and Semi urban Uttar Pradesh

[1]Dr. Md. Mubasheer Ali, Sr Consultant, Internal Medicine, Apollo Telehealth.

[2]Dr. Ayesha Nazneen, Sr Consultant & HOD, MRC, Apollo Telehealth.

[3]Mr. Vikram Thaploo, CEO, Apollo Telehealth.

[4]Mr.Shubham Jana, Manager, Public health research, Apollo Telehealth.

[5]Mr. Viplav Kirthi, General Manager, MRC, Apollo Telehealth.

[6]Mr. Premanand, CBO, Apollo Telehealth.

Corresponding Author: Dr. Md. Mubasheer Ali, Sr Consultant, Internal Medicine, Apollo Telehealth.

Citation this Article: Dr. Md. Mubasheer Ali, Dr. Ayesha Nazneen, Mr. Vikram Thaploo, Mr. Shubham Jana, Mr. Viplav Kirthi, Mr. Premanand, "Telemedicine in Resource Limited Settings to Optimize the Early Diagnosis of Pulmonary Tuberculosis in Rural and Semi urban Uttar Pradesh", IJMSIR - March - 2024, Vol – 9, Issue - 2, P. No. 51 – 59.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: The advent of the COVID-19 pandemic significantly accelerated the adoption of telemedicine, prompting its widespread use in managing various health conditions, including tuberculosis (TB). This study, conducted at Apollo Telehealth (ATH) in Hyderabad, explores the effectiveness of telemedicine in the diagnosis and treatment of TB, focusing on its impact across different demographics.

Methods: A retrospective cohort analysis was performed on 27,913 TB teleconsultations conducted from January to December 2021. The study utilized logistic regression models to evaluate the effectiveness of telemedicine in TB care, with a specific focus on confirmed diagnoses of Pulmonary Tuberculosis. The Hosmer and Lemeshow test were applied to assess the model fit, while the Omnibus Tests of Model Coefficients examined the significance of predictor variables.

Results: Among the teleconsultations analysed, 400 confirmed diagnoses of Pulmonary Tuberculosis based on positive sputum samples for Acid-Fast Bacilli (AFB) or chest X-ray findings. The Hosmer and Lemeshow test indicated an adequate fit of the logistic regression model to the data ($X^2(8) = 10.25$, $p = 0.245$). Further analysis revealed a significant association between predictor variables and TB diagnosis outcomes, emphasizing the role of age in enhancing the effectiveness and accessibility of telemedicine for TB management. Each year increase in age was associated with a 3.3% increase in the likelihood of effective and accessible telemedicine intervention for TB management ($B = 0.033$, $p < 0.001$).

Conclusion: This study highlights telemedicine's potential to improve TB care by facilitating early detection, diagnosis, and treatment adherence, particularly in the context of the COVID-19 pandemic. The findings underscore the importance of integrating telehealth into TB management strategies, especially for

diverse populations. Further research is needed to fully explore the capabilities and limitations of telemedicine in the comprehensive management of TB.

Keywords: Telemedicine; Tuberculosis (TB) Management; COVID-19 Pandemic; Pulmonary Tuberculosis Diagnosis; Digital Health Interventions

Introduction

In March 2020, the World Health Organization (WHO) declared the COVID-19 infection a pandemic [(1)]. This unprecedented health crisis has caused radical changes and adjustments in the healthcare provision in most countries of the world, raising concerns for the efficient and sustainable management of patients with chronic and infectious diseases which remain the most common cause of morbidity and mortality worldwide[(2)].As a part of finding a solution to reduce the impact on the already overburdened healthcare system during the COVID 19 outbreak, Ministry of health and family welfare, Government of India and Medical council of India have officially released telemedicine practice guidelines in March 2020 (Ministry of Health and Family Welfare, Government of India,2020), to help the clinicians efficiently manage the patients remotely by following all the necessary clinical protocols[(3)].

Telemedicine can be defined as the use of two-way information by leveraging telecommunication technologies to provide clinical care through a variety of remote methods [(4)]. Although telemedicine has been used for many years, its widespread application was peaked and brought about by the COVID-19 pandemic, and in the early stages of the health crisis it may have become the primary way of chronic, non-emergency care provision in most countries of the world [(4)].

Furthermore, there is evidence that telemedical infectious disease care is at least as cost-effective as traditional infectious disease care. Telemedicine has been in use for managing infectious disease since the 1990s, with early work focusing on treatment of HIV/AIDS, hepatitis C, and tuberculosis [(5,6)]. Today, as technology has advanced, the potential of telemedicine has expanded in innovative directions, and the use of telemedicine has expanded to the treatment of a wider array of both acute and chronic infections. Today's approaches incorporate novel technologies, such as high-definition cameras, integrated EMR (Electronic medical report), patient data safety, encryption software, POCT(Point of care) device integrated online portals and modules, and electronic stethoscopes, otoscopes, and ophthalmoscopes. These technological advances drive innovative uses of telemedicine for prevention, diagnosis, treatment, and management of infectious diseases.

Telemedicine is a broad term within the domain of digital health that encompasses a wide scope of practices, all relating to the delivery of health care at a distance. Digital health interventions and innovations have the potential to build upon all three pillars of the End TB Strategy [(7)]. The WHO has released a digital health strategic agenda describing different approaches[(8)]. The potential applications of digital health are broad and may include utilizing innovative approaches such as video-observed therapy to allow for a more patient-centred approach, applications for adherence support, remote patient consultations and remote technical assistance including consensus expert opinions for complex cases.

In order to address the financial and logistical issues public health departments experience in identifying, diagnosing, and using DOT while still providing effective treatment for TB patients, this research aims to investigate the potential use of telehealth. The use of technology to provide care remotely is known as telehealth. Telehealth has the potential to decrease travel time and expenses for the patient and the public health

department, increase scheduling flexibility, create a safer environment for healthcare workers by limiting their travel and exposure to tuberculosis, and perhaps even increase the likelihood of early detection and eventually therapy adherence. Telehealth most importantly facilitates speciality teleconsultations to these rural and semi urban patients free of cost, thus avoiding unnecessary delays in identifying TB and its diagnosis.

Operational Workflow for Suspected Tuberculosis Management

The patients visit the Community health centres (CHC) and get registered at the front desk. The patients depending on the clinical symptoms are then referred to ATH clinical desks to facilitate respective tele consultations remotely with specialists and super specialists at ATH hub in Hyderabad. Well trained and skilled paramedics hired by ATH manage these ATH consultation rooms with the help of world class POCT (point of care testing) devices designed and manufactured by ATH. Patients from rural, semi urban, and urban parts of the state visit these CHC's with their various health issues and avail free tele consultations with specialists and super specialists. They are further provided free medications including almost all the classes of drugs. Certain free lab investigations are also provided for the patients at the behest of Apollo Telehealth.

Patients with respiratory tract infections with history of cough, sputum, shortness of breath and chest pain are tele consulted by General medicine specialists of ATH and after thorough history of present and past illnesses, the patient is examined by the paramedic with the POCT devices, under the virtual supervision and guidance of the specialist doctor. After initial evaluation if there is suspicion of pulmonary TB, the patient is prescribed symptomatic treatment and advised investigations such as sputum for acid fast bacilli (AFB), Chest xray, CBC etc which are done at the CHC free of cost. ATH follows a fixed clinical workflow for the clinical workup and referral process of newly diagnosed TB patients so that there is no further spread of the infection. This clinical workflow is vetted by the ATH clinical team in lieu of the clinical guidelines laid out by World health organisation (WHO) and American Lung association. Once sputum for AFB is positive the patient is immediately referred to DOTS (Directly observed therapy) centre and the relevant Nodal officer is also notified. If both sputum for AFB and chest x-ray are negative for any TB signs but patient has very consistent symptoms of clinical TB, then the patient is referred to the nearest government higher centre for physical and clinical examination for further evaluation. If the sputum for AFB is negative, but chest x-ray shows signs of pulmonary TB, the patient are still referred to DOTS centre for further evaluation and thereafter initiation of anti-tubercular therapy (ATT), based on the clinical suspicion and positive x-ray findings S (Fig. 01).

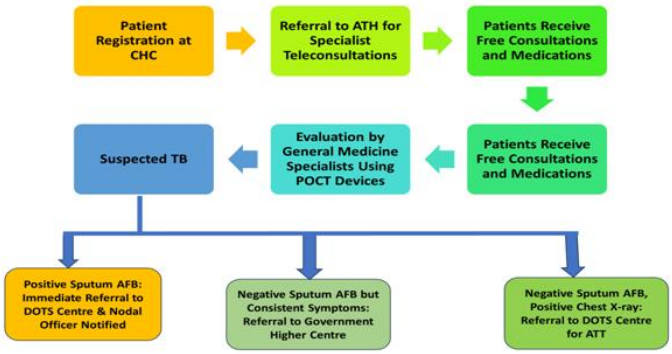

Figure 1: Operational Workflow for Suspected Tuberculosis Management

EMR Retrieval and Processing for Tuberculosis Consultations

Our data of EMR (electronic medical record) was retrieved from all the CHC's of UPTM from the internal servers of ATH which included the patient demographical record, the raw data of transcripts of

teleconsultations available in the dropdown sections provided for primary diagnosis, secondary diagnosis, treatment advised and chief complaints and also free text form of history of present illness that were typed by each attending physician during the teleconsultations with their corresponding clinical information (History of respiratory tract infections, Chronic cough with sputum, past history of TB, family history of TB etc.,) for each of the calls. To select the internal data from ATH we filtered the calls that corresponded to the TB teleconsultations that were classified by the teleconsultant (physicians), during each of the calls. To ensure the robustness of the data, structure of the database and text formatting, we performed a visual inspection from a sample of cases chosen at random. From the structure of the EMR database, we identified duplicate data that we removed; excluded teleconsultations not pertaining to TB, as some of the tele consultations (TC) were general TB queries. As the nature of some of our data was in the form of text, we searched for alternatives to transform the qualitative information into a quantitative representation. We identified two strategies, the first one was to estimate the frequency of terms that provided the most common mentioned terms and the second one estimating clusters of topics. Collected data was primarily synthesized and presented as descriptive statistics (frequencies and proportions). We used Microsoft Excel to tabulate and analyse the data (Figure No: 02).

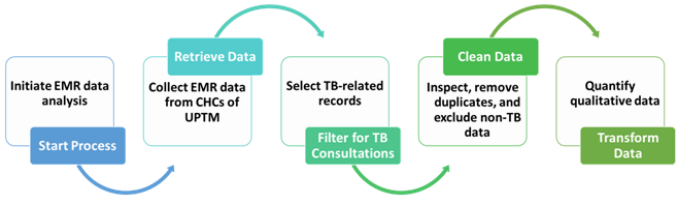

Figure 2: EMR Retrieval and Processing for Tuberculosis Consultations

Methodology

This retrospective cohort study was conducted at Apollo Telehealth (ATH) in Hyderabad over the period from January 2021 to December 2021. The primary focus of this investigation was to assess the impact of telemedicine on tuberculosis (TB) detection, diagnosis, and outcomes, particularly in relation to gender and age.

Data Privacy and Security Measures: Prior to commencing data analysis, stringent measures were taken to ensure the confidentiality of all participants involved in the study. Specifically, all patient and physician identifiers were meticulously removed from the voice and video call data under review, guaranteeing anonymity and security of personal information.

Study Population and Data Collection: The study analyzed a total of 27,913 TB teleconsultations conducted by specialists within the designated study timeframe. Among these, 400 teleconsultations resulted in a confirmed diagnosis of Pulmonary Tuberculosis, based on either positive sputum samples for Acid-Fast Bacilli (AFB), indicative Chest X-ray findings, or a combination of both.

Objectives

The main objectives of the study were delineated as follows:

- To evaluate the impact of telemedicine on the prevalence and outcomes of TB across different genders.
- To explore the influence of age on the effectiveness and accessibility of telemedicine services for the early detection and diagnosis of TB.

Study Design: A retrospective cohort study design was employed, leveraging existing teleconsultations data. This approach facilitated a comprehensive analysis of the effectiveness of telemedicine interventions in the

diagnosis and management of TB, with a specific focus on demographic variables such as age and gender.

Results

This review was done at Apollo Telehealth (ATH), Hyderabad from January 2021 to December 2021. There were 27,913 number of total TB tele consultations done by specialists between the study period January 2021 and December 2021.Out of these ,400 teleconsultations confirmed the diagnosis of Pulmonary Tuberculosis depending on positive sputum samples for AFB or Chest Xray or both.

The statistical analysis conducted on the telemedicine intervention for TB diagnosis in Uttar Pradesh revealed significant findings by using of SPSS ver. 26.

The Hosmer and Lemeshow test yielded a test statistic of X2(8) =10.25X2(8) =10.25 with a p-value of0.245. The non-significant p-value suggests that there is no significant lack of fit (p>0.05), indicating that the logistic regression model adequately fits the data. The sample consisted of N=400participants, with observations stratified by **gender (Table No. 01 & 02).**

Table 1: Contingency Table for Hosmer and Lemeshow Test

		Gender Id = Female		Gender Id = Male		Total
		Observed	Expected	Observed	Expected	
Step 1	1	17	15.706	19	20.294	36
	2	14	13.577	22	22.423	36
	3	11	11.985	25	24.015	36
	4	11	10.968	26	26.032	37
	5	10	9.854	27	27.146	37
	6	9	8.819	28	28.181	37
	7	6	7.898	31	29.102	37
	8	4	7.010	34	30.990	38
	9	7	5.908	30	31.092	37
	10	9	6.276	41	43.724	50

The Hosmer and Lemeshow Test was conducted to evaluate how well our logistic regression model fits the observed data.

Step 1 Results

- Chi-square = 4.096
- Degrees of freedom (df) = 8
- Significance level (Sig.) = 0.848

The p-value associated with the Hosmer and Lemeshow Test in Step 1 is 0.848. Since this p-value isgreater than the conventional significance level of 0.05, we fail to reject the null hypothesis.

The omnibus test of model coefficients showed a significant relationship between the variables in the equation. This means that there is a statistically significant association between the predictor's variables and the outcome variable Table 2.

Table 2: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	18.395	1	.000
	Block	18.395	1	.000
	Model	18.395	1	.000

The positive coefficient (B = 0.033) indicates that as age increases, there is a corresponding increase in the effectiveness and accessibility of telemedicine for TB management. The p-value of 0.000 suggests a strong statistical significance, emphasizing the robustness of the relationship between age and telemedicine effectiveness. Our findings imply that age plays a crucial role in determining the success of telemedicine in TB management. As age increases, there is a notable positive impact on the effectiveness and accessibility of telemedicine for managing TB cases Table: 3.

Table 3: Variables in the Equation for age

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	age	.033	.008	17.206	1	.000	1.033
	Constant	-.334	.343	.949	1	.330	.716

These findings suggest that the variables included in the analysis have a meaningful impact on the effectiveness of telemedicine in identifying tuberculosis, highlighting the importance of considering these factors in healthcare interventions and policy decisions.

Discussion

Averaging nine million cases each year, tuberculosis (TB) is one of the most common infectious diseases in the world. Despite being treatable, tuberculosis (TB) causes over a million deaths worldwide each year[9]. One of the main health issues in India is still tuberculosis. Over 2 million TB cases are reported from India annually. There is still more work to be done to contain the epidemic because severe types of treatment-resistant tuberculosis are emerging and there are worries about TB medicine shortages [10].

By offering free basic tuberculosis diagnosis and treatment to all patients in the public sector, the Revised National Tuberculosis Control Programme (RNTCP) has made significant progress. The RNTCP recently said that its new objective for the upcoming five-year plan will be "universal access to quality TB diagnosis and treatment for all TB patients in the community [11]." This is a commendable objective, but any strategy to treat every TB patient in India must take the country's large private sector into account.

Despite this progress, TB incidence and mortality are still very high, and in 2009 an estimated 280,000 people died of TB in the country [12]. A vast proportion of TB cases continue to be initially managed in the private sector, frequently inadequately and without subsidy for diagnosis and treatment that patients can frequently ill-afford. Nearly 50 per cent of the retreatment cases notified under RNTCP are treated in other sectors before reaching RNTCP, suggesting late identification, late diagnosis, inadequate treatment, and possible amplification of drug resistance (unpublished data from Central TB Division, GoI[13]. The most serious challenge to TB control is in rural and semi urban areas. These areas still experience intense levels of TB transmission, where primary health care systems tend to be weaker due to geographical terrain and unavailability of speciality health care, and therefore private health care predominates. MDR-TB/XDR-TB (multi drug resistant tuberculosis) occurs due to misuse of anti-TB drugs and interrupted treatment, largely in the private sector, and then can be spread in the community unless it is correctly diagnosed and treated. Linking HIV-infected TB patients to HIV care and support and implementing measures to prevent TB in HIV care settings also need further strengthening.

With 75 districts and 18 divisions, managing the TB program presents numerous obstacles for UP. Given that telemedicine accounts for 20% of all drug-sensitive TB cases in India, this case study was conducted to examine the state of TB in Uttar Pradesh and the advances made possible by its use. Owing to its size and population, Uttar Pradesh was the first state in India to set up Regional TB Programme Management Units (RTPMU) to improve oversight and monitoring of the state's tuberculosis program. The RTPMUs created demonstrate the state's decentralization initiatives by associating each area with a specific RTPMU and enhancing TB responsibility. However, a more targeted strategy is needed for every single part of the TB program in UP. since even a small adjustment of the TB situation in Uttar Pradesh will have a significant effect on the country's TB

status and open the door for India to eradicate TB by 2025(10). The State TB Cell (STC), based in Lucknow, oversees UP's participation in the National TB Eradication Program (NTEP). Situated in Agra is the State TB Training and Demonstration Centre (STDC).

The purpose of STDC is to efficiently oversee and manage the program. It is the top institution in the state for providing top-notch workshops and training to all the state's important managers and supervisors. To improve programmatic monitoring, the state established five Regional TB programmatic Monitoring Units (RTPMUs)(10). There are 2063 Designated Microscopy Centers (DMC), 993 Tuberculosis Units (TU), and 75 District Tuberculosis Centers (DTC) in the state. Eleven Culture & Drug Susceptibility Testing (C & DST) laboratories, including two Intermediate Reference Laboratories (IRL) and 148 CBNAAT/True NAT sites that are functioning throughout the state, comprise the laboratory infrastructure. Of them, five have LPA facilities. To manage DR-TB, a total of twenty-three centers have been constructed[14].

Despite being a positive collaboration, public-private mix initiatives still make up a very small percentage of total private sector providers; as a result, their impact has been very minor thus far[15]. The UP (Uttar Pradesh) government and Apollo Telehealth (ATH) have one of these great public-private collaborations. In order to fill the shortage of specialists in the state, ATH, in collaboration with the government of Uttar Pradesh (UP), established its Telemedicine centers throughout 120 community health centers in the eastern region of the state[16].Teleconsultations in 13 specific specialties, including general medicine, paediatrics, gynaecology, skin and veins, neurology, nephrology, urology, physical medicine and rehabilitation, oncology, and gastroenterology, are among the services offered throughout these centers.

These facilities are well-equipped with cutting-edge medical equipment for various vital tests, including temperature, SPO2, ECG, and NIBP, as well as laboratory services. The newest software and EMR are used to enable virtual consultations, giving patients and service providers access to digital data in the form of dashboards. In addition to primary healthcare, the centers concentrate on infectious diseases, non-communicable disorders, and mothers and children. In just 7 months since the program's launch, more than 1.2 lac teleconsultations had been given. These facilities are open for business eight hours a day, six days a week. Patients are referred to higher level government healthcare facilities for serious illnesses. ATH wants to have a big effect by providing the 200 million underprivileged people in Uttar Pradesh with high-quality healthcare services that are inexpensive and easily accessible [16].

Limitations

One of the fundamental limitations of this study is the inability to conduct comprehensive physical examinations remotely. Unlike other conditions where symptoms may be evident through video consultations, TB often requires thorough examination of respiratory symptoms, which cannot be adequately assessed without in-person interaction.

Another limitation of this study is treatment monitoring challenge. While telemedicine can facilitate communication with patients, it might be difficult to monitor treatment adherence remotely. Directly observing patients taking their medication is ideal for ensuring they complete the full course, which is critical for preventing drug-resistant TB.

Conclusion

Telemedicine has proven to be the best example in defining the phrase "bridging the healthcare gap" in every practical sense, by connecting TB patients with healthcare services and specialists remotely, crucial for regions like UP, lacking essential medical infrastructure and clinical resources. It has ensured that geographical and travel barriers do not prevent access to the rightful care through early identification and diagnosis of TB and therefore timely management, thus preventing unnecessary medical complications. This paper also establishes the fact that telemedicine not only accelerates and facilitates the process of early identification and proper diagnosis of TB, but also aids in monitoring treatment adherence via ATH digital platform, allowing for direct observation and management of medication regimes and supervising. This helps ensure patients complete their treatments andassist in adverse effect management, improving recovery rates. This study highlights how telemedicine has become a more accessible and cost-effective option for tuberculosis screening and diagnosis by eliminating the need for physical infrastructure and travel. This is especially helpful for healthcare systems in resource-constrained settings, such as rural and semi-urban areas of Uttar Pradesh. In this instance, Apollo Telehealth and Telemedicine provide a model of providing specialized healthcare and enabling the early detection, timely diagnosis, and digital prevention of major tuberculosis sequelae.

Physicians and patients are highly recommended to use telehealth technologies as a suitable choice to diagnose and avoid the spread of TB infection in light of the outcomes of this review research. Evidence of the effect of digital technologies to improve TB care remains limited. More studies of better quality are needed to determine how such technologies can enhance programme performance.

Acknowledgements

Our heartfelt thanks go to the patients, healthcare professionals, and the team at Apollo Telehealth (ATH) for their invaluable participation in this study. We extend special appreciation to our colleagues, family, and friends for their constant support and motivation.

References

1. Anderson R, H H, D K, TD H. Who director-general's opening remarks at the media briefing – 5 may 2023 [Internet]. World Health Organization; [cited 2024 Mar 5]. Available from: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing---5-may-2023
2. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the covid-19 epidemic? The Lancet. 2020 Mar;395(10228):931–4. doi:10.1016/s0140-6736(20)30567-5
3. [Internet]. [cited 2024 Mar 5]. Available from: https://www.mohfw.gov.in/pdf/Telemedicine.pdf
4. Koonin LM, Hoots B, Tsang CA, Leroy Z, Farris K, Jolly B, et al. Trends in the use of telehealth during the emergence of the COVID-19 pandemic — United States, January–March 2020. MMWR Morbidity and Mortality Weekly Report. 2020 Oct 30;69(43):1595–9. doi:10.15585/mmwr.mm6943a3
5. DeMaio J, Schwartz L, Cooley P, Tice A. The application of telemedicine technology to a directly observed therapy program for tuberculosis: a pilot project. Clin Infect Dis. 2001;33:2082–4. 8.
6. DeMaio J, Sharma D. Tuberculosis therapy and telemedicine. Expert OpinPharmacother. 2002;3:1283–8

7. Wootton R, Bonnardot L. Telemedicine in low-resource settings. Frontiers in Public Health. 2015 Jan 21;3. doi:10.3389/fpubh.2015.00003
8. World Health Organization. Digital Health for the END TB Strategy: an Agenda for Action. (2015). Available online at: https://www.who.int/tb/areas-of-work/digital-health / Digital_ health_ End TB strategy. pdf?ua=1 (accessed March 22, 2019).
9. Thought leadership archive [Internet]. [cited 2024 Mar 5]. Available from: https:/ / www. phi.org/ resources /?resource=using-telehealth-for-directly-observed-therapy-in-treating-tuberculosis
10. Pai M. Promoting affordable and quality tuberculosis testing in India. Journal of Laboratory Physicians. 2013 Jan;5(01):01–4. doi:10.4103/0974-2727.115895
11. Sachdeva KS, Kumar A, Dewan P, Kumar A, Satyanarayana S. New vision for Revised National Tuberculosis Control Programme (RNTCP): Universal access - "reaching the un-reached". Indian J Med Res. 2012 May;135(5):690-4. PMID: 22771603; PMCID: PMC3401704.
12. Dhamnetiya D, Patel P, Jha RP, Shri N, Singh M, Bhattacharyya K. Trends in incidence and mortality of tuberculosis in India over past three decades: A joinpoint and age–period–cohort analysis. BMC Pulmonary Medicine. 2021 Nov 16;21(1). doi:10.1186/s12890-021-01740-y
13. India TB Report 2022 [Internet]. [cited 2024 Mar 5]. Available from: https: // tbcindia. gov.in/ Write Read Data /IndiaTBReport2022/
14. Chauhan A. “National TB elimination program in Uttar Pradesh, India: A case study of a country within the country.” Biomedical Journal of Scientific & Technical Research. 2021 Sept 29;39(1). doi:10.26717/bjstr.2021.39.006246
15. Lal SS; Sahu S; Wares F; Lönnroth K; Chauhan LS; Uplekar M; Intensified scale-up of public-private mix: A systems approach to tuberculosis care and control in India [Internet]. U.S. National Library of Medicine; [cited 2024 Mar 5]. Available from: https://pubmed.ncbi.nlm.nih.gov/21276304/
16. Uttar Pradesh: Telemedicine consultation: Telehealth Services: Apollo Telehealth [Internet]. 2022 [cited 2024 Mar 5]. Available from: https: // www. apollotelehealth.com /public-private-partnerships/up-tele-medicine-centers/