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Tuberculosis control in Pakistan: A decade (2011-2020) in review

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Abstract

This paper reviews the overarching strategies, implementation rigour, achievements, strengths and weaknesses, and challenges and opportunities faced by Pakistan's National Tuberculosis Control Program (NTP) during the period 2011-2020. NTP's annual reports, Global Tuberculosis (TB) Report (2019 & 2020), peer-reviewed journal articles, NTP and NSP plans, along with voluminous programmatic data reviewed. Pakistan's national and provincial tuberculosis control program has treated around four million people and gained more than 90% treatment success. Iterative planning, partnership with the private sector, strategic advocacy, communication, social mobilization, operational research, and increasing domestic funding are essential to improving case notification and treatment success. Lack of adequate political commitment, over-and under-reporting, lack of a systematic mechanism for sputum transport, and inefficient coverage from the private sector are the main areas for improvement. Local and national strategic planning in funding, program development, and implementation is imperative from a multisectoral perspective for ending TB. Ensuring universal health coverage, treating drug-resistant cases, maintaining and strengthening the national health information system, and upgrading the vital registration system is the cornerstone for ending TB.

Keywords: Tuberculosis, prevention, prevalence, incidence, strategies, Pakistan

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Introduction

Pakistan is among the five countries with the highest tuberculosis burden of disease in the world. To pursue the globally endorsed end TB strategy actively and effectively, improving access to and quality of TB control services and scaling up the workforce knowledge, skills and motivation, remain the highest priority. The pandemic of COVID-19 has blurred the health impacts of all essential health services, and Tuberculosis is no exception. Like the rest of the world, the pandemic that began around March 2020 overwhelmed the provision of routine health care facilities in Pakistan (1), adversely affecting the case notification and diagnosis, which decreased by 80% for 1-2 quarters beyond March 2020 (2), in line with a global drop in TB case notification, because of which 400,000 additional TB deaths may occur worldwide. The UN Secretary-General has set multiple targets for ending TB. These include a) mobilization of leadership, b) establishing a multisectoral accountability framework for combating TB, c) fundraising and ensuring universal health coverage (UHC) for enhancing the quality of care, d) resolution of drug-resistant TB, promotion of human rights, increasing investment in TB research, ensuring prevention of TB cases and safeguarding the interest of TB patients in the context of COVID-19 pandemic are some of the underlined priorities warranting urgent attention. Equitable financing and continued WHO technical support will be crucial in the run-up towards the next United Nation High-Level Meeting (UN-HLM) scheduled for 2023 (1-3).

The decline in Pakistan is significant. However, the population yet ranks fifth (3) among the 30 high burden countries (4) of the world, which are struggling against Tuberculosis (TB). Based on an estimated incidence rate of 263 per 100,000 population, the total number of new TB cases in Pakistan during 2019 was 570,000 (5). The country is also in fifth place for drug-resistant TB, with a total incidence of 28,000 (6) annually. The burden of TB in Pakistan comprises both drug-sensitive and drug-resistant cases and the cases resulting from TB-human immunodeficiency virus (HIV) coinfection.

A paucity of finances impacts any program's performance. Five countries account for more than half of the global funding gap across the world, and with a total deficit of 104 million USD, Pakistan is responsible for 8% of this gap. Pakistan has a total service coverage of 45%, with an estimated 4.5% as catastrophic health expenditures (7). The United Nations High-level meeting on Tuberculosis held in 2018 provided a unique opportunity to leverage funds and enhance the efforts to end TB; however, the COVID-19 pandemic has adversely affected the health care delivery systems.

In 2010, we reviewed the performance of the National TB Control Program for the first decade of its existence, i.e., 2001-10 (8). Aligned with that approach, we review the 2011-2020 period. Our main objective is to document the achievements, successes and failures of the National TB Control Program (NTP) while underlining its future challenges and priorities.

Methodology

We started our process with an extensive secondary review of published research papers, available national data on Tuberculosis, including NTP annual reports, the world health organization (WHO) Global TB reports, and joint program review mission reports by using mesh word; TB achievements reports, strategies, progress, control, prevention etc. In addition, we also perused the strategic documents, technical guidelines by NTP and WHO, and other programmatic materials. At the national level, we obtained programmatic data from the NTP for 2011-2015 and its successor, the Common Management Unit (CMU) for Acquired immunodeficiency syndrome AIDS, TB and Malaria, since 2016. Excluded the unpublished data in this review (figure 1).

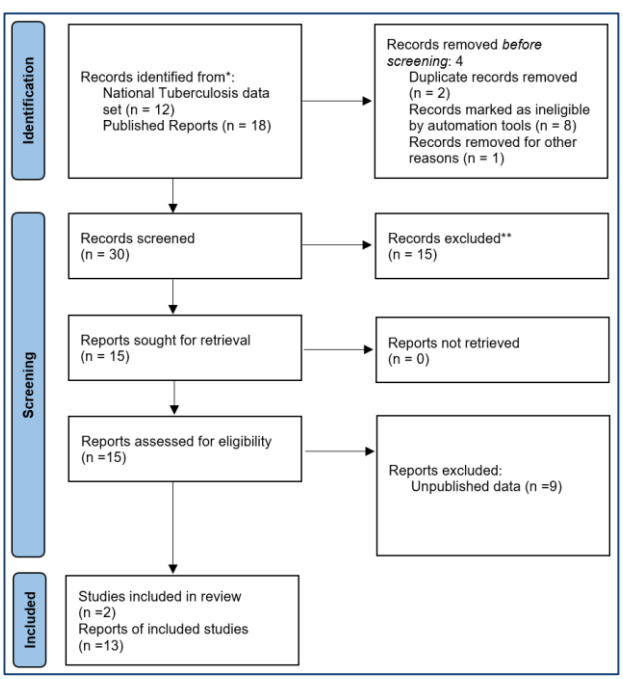

Figure 1: Flow diagram used for this review

We obtained data on all dimensions of TB care, including case notification, drug-sensitive and drug-resistant Tuberculosis treatment, civil society engagement, and the overall monitoring and evaluation of the program. We paid equal attention to the data around program strategies and their implementation, along with the relevant program outputs. The Results section reports our findings under the broad headings of contextual landscape, strategic framework, and concrete outcomes.

Results

Contextual landscape

The health care delivery system of Pakistan includes the provincial and district health departments with a vast network of hospitals and health facilities, non-governmental organizations (NGOs), health service for the armed forces, and a large (though unregulated) private sector-around 2/3rd of the population in prefers private sector, according to estimates. The NTP was initially disbanded and later revived, with a shriveled mandate. The Federal Ministry of Health was dissolved in 2011, and most powers were transferred to the provinces. However, it was re-established in 2013 with a new mandate predominately related to regulation and inter-provincial coordination. In 2016, the Ministry of Health merged the TB, AIDS and Malaria programs under the Common Management Unit (CMU), with the programs effectively losing their individualized nature (5).

Strategic framework

The strategic framework of the NTP (Figure 2) comprises five building blocks, including i) partnerships, ii) drug supply and management, iii) public-private mix, iv) TB-HIV coinfection, and v) drug-resistant TB. Three cross-cutting functions support these processes: i) advocacy, communication and social mobilization, ii) monitoring, evaluation and measurement, and iii) operational research. Together these functions lead to the two intermediate results of case detection and standardized treatment, ultimately leading to improved health outcomes (2).

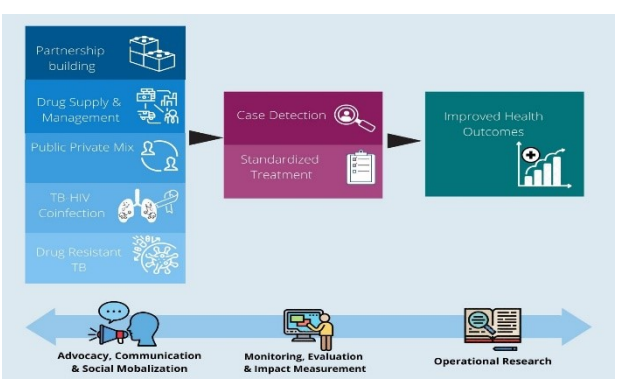

Figure 2: NTP's strategic framework (Source: WHO National action Plan)

Partnership building

The NTP has been working since 2016 as part of the Common Management Unit (CMU) for AIDS, TB and Malaria in collaboration with international and national partners, such as the World Health Organization (WHO), the United States Agency for International Development (USAID) and The Global Fund (GF). Several other multilateral and bilateral donor agencies, national and international NGOs, professional bodies such as the Pakistan Chest Society and the Pakistan Pediatrics Association, and private sector physicians are also on the list (6).

Drug supply and management

Providing quality health supplies from national to provincial to the district level until the last mile is reached is vital for national and provincial programs. The programs review the medicine stocks twice a year to avoid any shortage or use of expired drugs. Procurement and supply chain management is carried out in coordination with the national and international stakeholders such as the Global Drug Facility (GDF) and WHO. Emphasis is placed on quality assurance, forecasting requirements, drug quantification, risks, and challenges as part of the overall drug management system(3).

Monitoring evaluation and impact measurement

Monitoring and Evaluation (M&E) is a critical component of program management. The CMU has an integrated team for the M&E planning, surveillance, utilization of data, quality assessment and operational research functions. The main thrust is on the timely implementation of the action plan using the information available at national and sub-national levels. This assists in evaluating program performance at all levels and identifying factors responsible for impeding the service delivery.

Public-Private mix

The public-private mix is implemented with the help of several partners. Mercy Corps has been the principal recipient of the Global Fund grant for PPM since 2007; currently operating in 66 districts of Pakistan (including Punjab, KP, Balochistan, AJ&K, ICT and GB), implementing the GF grant through its six sub-recipients (SRs). Initially limited to enhancing the case notification rate through general practitioners (GPs), the PPM is now scaled up to all types of the private sector, including NGOs, private hospitals, parastatal, and other public hospitals. Specified private sector hospitals, TBMUs, and non-governmental organizations (NGOs) provide microscopy services.

Drug-Resistant TB

Drug-resistant TB is important as approximately 15,000 drug-resistant TB (DR-TB) cases are reported annually in Pakistan, the fifth-highest in countries with a significant caseload of Tuberculosis. Use of inappropriate or poor-quality medicines, lack of adherence to treatment protocols, diagnostic delays, high mortality and loss to follow-up are the factors responsible for the low treatment success in DR-TB. In 2010, programmatic management of drug-resistant TB (PMDT) sites was initiated, which received full countrywide coverage by 2016 with 33 PMDT sites, although these are yet inadequate for a country of 220 million population.

TB-HIV Coinfection

The problem of TB-HIV coinfection is on the rise. In 2016, only 4% of HIV-positive persons tested positive for TB. However, in 2019, the number increased six-fold to 24%. A large percentage of TB patients are missed every year due to limited testing. The CMU now has a National TB-HIV Collaborating Board to optimize case detection and treatment in all cases of TB-HIV coinfection. At present, 41 sentinel sites are focusing on monitoring HIV infection in TB patients and vice versa.

Advocacy, Communication and Social mobilization

The Advocacy, Communication, and Social Mobilization (ACSM) interventions include mass-media and community-based activities that continue through the year. On World TB days, the program organizes special press briefings. Sports events, print and electronic media use, illumination of prominent buildings, and rallies for TB awareness purposes are also part of the ACSM strategy. Coinciding with UN-HLM-TB, the national End-TB initiative was launched on Apr 3, 2019, by the President of Pakistan. The release of video messages from parliamentarians, celebrities' engagement to raise awareness on social media, and the organization of TV and radio shows of TB survivors also align with important milestones.

Operational Research

Research is a critical area to inform strategic and operational planning and other elements of the End TB strategy. NTP accordingly established a research unit in 2009, which now covers the entire CMU. Over the past few years, the unit has designed and implemented several research projects, such as the National TB Prevalence Survey 2010-2011 and two major national studies; one on adults in 2012 and another in 2016 on children, in addition to several studies on a lesser scale.

Outcomes

Case detection through quality-assured bacteriology

A total of 1,746, including 411 private sector laboratories, were testing for TB during 2019. In 2019, 327 GeneXpert laboratories with machines including 295 GX-IV and 66 GX-XVI modules were installed in these laboratories for rapid detection of TB cases across the country. This marked a significant landmark in innovative TB diagnosis in Pakistan during the decade under review. The population coverage per module was increased from 2,236 to 99,916, with the highest coverage in ICT, Sindh, and GB. In 2019, a total of 452,934 diagnostic tests were performed, out of which 299,229 were at NTP sites, 138,730 by the Indus Health Network (IHN), and 14,975 by the Mercy Corps supported sites.

During the period under this review, the TB program steadily enhanced its case detection (all forms) from 271,858 in 2011 to 366,061 in 2016 (Figure 3) where it plateaued till the year 2018. However, the number declined to 334,846 in the year 2019. The new and relapse cases also showed a similar trend during this decade.

The positive presumptive cases declined from 16.6% in 2010 to 11.2% in 2019, while the positivity rate increased from 3.2% in 2010 to 4.6% in 2019. Among the tested patients, 860,878 were reported positive for MTB, and 3,820 were rifampicin-resistant cases. Due to improved coverage and extension in GeneXpert testing, the proportion of MTB positive cases declined from 46% in 2014 to 23.5%

in 2019. Rifampicin resistance (RR) was detected among MTB positive from 18.9% in 2014 to 4.6% in 2019. Around 9.5% MTB+ and 3.5% RR Tb cases were detected out of 138,730 Xpert tests performed in 2019.

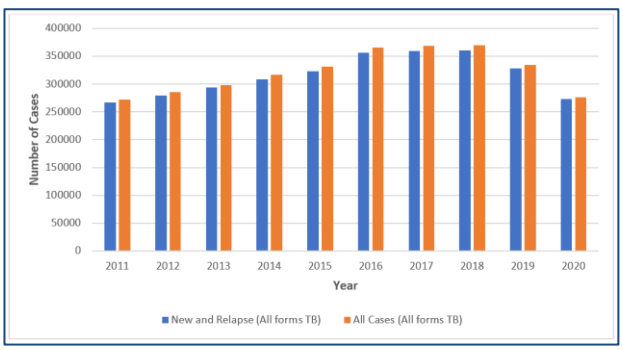

Figure 3: Number of notified TB cases (all forms and new & relapse) during 2011-2020

Standardized treatment with Patient Support

Total 14,321 TB Management Units (TBMUs) are available for Drug Sensitive TB (DS-TB) cases in both the public and private sectors. Every TBMU has both diagnostic and treatment facilities like TB drugs, trained staff, equipment and minor instruments, in addition to drugs for minor ailments. During the decade the case detection and treatment success (Figure 4) remained fairly high from 2011 till 2017, after which both showed a decline. The trend continued more sharply in 2020 with the advent of COVID-19.

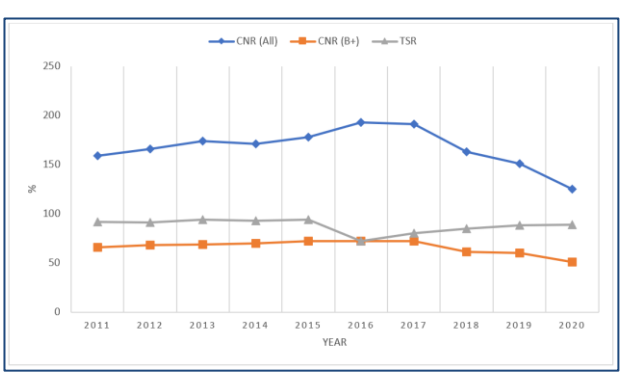

Figure 4: Trends in case detection & treatment success in Pakistan 2011-2020

The treatment success rate for all forms (including B+ cases) crossed the acceptable target of ≥ 90% in 2019 at the national level. A total of 88 districts provide PPM model interventions, while 13 pilot implementation districts provide pediatric TB care facilities for children. The NTP has engaged 125 NGOs, 3,500 general practitioners, 35 private hospitals and 45 parastatal hospitals in the public-private mix activities in 88 districts. The proportion of TB case notifications from PPM doubled from 20% in 2013 to 41% in 2019.

Discussion

The national and provincial programs treated around 1.5 million people between 2001-2010, while more than 2.5 million people with quality drugs from 2011-2020, consistently maintaining more than or equal to a 90% treatment success rate. Rapid molecular diagnostic tests, active case finding, and other innovative approaches helped improve TB case finding, particularly among patients attending private practitioners, prisoners and working in coal mines. In addition, the provinces are ensuring the implementation of legislation or executive orders for ensuring mandatory case notification of TB patients, particularly in the private health sector (9).

These interventions were also catalyzed by international developments such as the WHO global ministerial conference on TB organized in 2017, its outcome briefing the Moscow Declaration to End-TB, followed in 2018 by the first-ever United Nations High-Level Meeting (UN-HLM) showing commitment to SDG (3) through universal health coverage and elimination of TB (10).

One of the areas for improvement is the Multisectoral Accountability Framework (MAF), involving the social and financing sectors, as envisaged in the UN-HLM. The Joint Program Review Mission (JPRM) organized by WHO and other development partners in 2018 also recommended MAF asking for greater political commitment and robust civil society engagement for ending TB in the country. The JPRM also recommended focusing on key at-risk populations through active case finding, where necessary (11).

Strengthening TB surveillance is another area showing room for improvement. According to estimates, over 200,000 people with DS-TB and 25,000 people with DR-TB are missed each year. On the other hand, those detected do not receive quality services. There was a 22% increase in case notification from 2013-2017, but a significant proportion could not receive quality care services. Private general practitioners (GPs) are the first line of care for a considerable proportion of patients. However, only 5% of them yet engage in TB diagnosis and treatment by notifying cases to the provincial and national databases.

Children aged 0-14 years comprise 35% of the total population. The program reported 45,447 children having TB in 2019, amounting to 14% of TB case notifications. This case notification has increased since the involvement of the private sector in 2012; however, further improvement is required. The main difficulty confronted in estimating childhood TB is the lack of quality data for planning and evaluation, which means surveillance of childhood TB needs improvement.

Over 5,000 Basic Health Units (BHUs) are fully functional at the union council (lowest administrative unit) level in Pakistan. Only 124 have adequate infrastructure for treating TB patients along with referral linkages for specialized care. Except for Sindh, the involvement of lady

health workers (LHWs) in presumptive TB case finding, management of TB, contact screening or defaulter tracing is non-existent, which needs rectification.

There is an absence of a standardized mechanism for transporting sputum specimens from primary level facilities to the nearest diagnostic facility or GeneXpert facility for MTB-RIF testing. The TB prevalence survey implemented in 2011 in Pakistan showed that only 61% of diagnosed TB cases were screened based on symptoms such as cough for more than two weeks. The rest of the cases were detected based on abnormalities detected in chest X-rays (12).

Lack of adherence to protocols leading to treatment failures is common at teaching hospitals; a cohort from Peshawar in 2012-2013 showed a treatment success rate of only 78.7%, indicating challenges in tertiary care settings (13). Similarly, the transmission level of MDR-TB assessed among 2009 index cases showed that around 1,467 household contacts were identified and screened. Among them, 95 were children under five years of age. Out of these, a total of 56 (3.8%) were diagnosed with Tuberculosis, while the vast majority (96%; 54) were MDR-TB cases, and only two cases (4%) had drug-susceptible Tuberculosis (14).

The practices of private practitioners are another area of concern; their adherence to NTP guidelines is insufficient. The practitioners of non-allopathic or traditional medicine and their practices are another grey area. According to studies, the private sector (all forms) provides health care services to almost 70% of the population (15), and less than half of these private practitioners even suggest sputum microscopy for TB diagnosis, according to a systematic review (16).

Globally, due to rising healthcare costs, around 5% of the population was pushed deeper into poverty, with around 150 million facing financial calamity and 100 million pushed below the poverty line in 2010 (17). A crucial target of the End-TB Strategy is that no household suffers from catastrophic costs due to TB (18). Although deaths due to Tuberculosis declined from 1.6 to 1.5 million in 2018, it remains one of the leading killers globally (19). The SDG target for 2020 was a 35% reduction in TB deaths and a 20% reduction in TB incidence compared to 2015. Catastrophic costs usually occur due to out-of-pocket expenditure on healthcare that surpasses the household income on nonfood expenses, particularly where even relatively small expenditure has a devastating effect on those already on the brink of poverty (20).

The WHO's End TB strategy set targets for 2020-2035 for reducing 20% TB incidence and 35% reduction in TB deaths by 2020 (21). A total of 10.0 million new cases of Tuberculosis emerged in 2019, with around 1.4 million deaths globally despite the high coverage of TB treatment and care services. The significant number of missing cases, high mortality rate, the evolution of severe forms of drug resistance, and the slow decline in TB incidence indicate that the present coverage of TB is inadequate to end this epidemic. Therefore, it is essential to invest more in TB, focusing on the quality of TB care and enhancing the coverage (22).

Conclusion

This review concluded that the multisectoral action against Tuberculosis involving the private health sector, civil society organizations and the communities is essential for accelerating the end of TB in Pakistan. The reported high rate of HIV-positive cases for TB needs containment through pragmatic actions. To significantly reduce TB morbidity and mortality at the national and provincial level, the provincial governments need to substantially enhance their domestic financing to complement the short-and-medium-term international support. High-quality TB surveillance, laboratory work, and clinical and operational research can gear up universal health coverage and achieve a Pakistan free of Tuberculosis.

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