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**TUBERCULOSIS IN INDIA AND KYRGYZSTAN: A COMPARATIVE ANALYSIS WITH
RECOMMENDATIONS FOR IMPROVEMENT**

ИНДИЯ ЖАНА КЫРГЫЗСТАНДАГЫ ТУБЕРКУЛЕЗ: САЛЫШТЫРМАЛУУ АНАЛИЗ
ЖАНА ЖАКШЫРТУУ СУНУШТАРЫ

ТУБЕРКУЛЕЗ В ИНДИИ И КЫРГЫЗСТАНЕ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ И
РЕКОМЕНДАЦИИ ПО УЛУЧШЕНИЮ

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TUBERCULOSIS IN INDIA AND KYRGYZSTAN: A COMPARATIVE ANALYSIS WITH RECOMMENDATIONS FOR IMPROVEMENT

Abstract

Tuberculosis (TB) remains a significant public health challenge in India and Kyrgyzstan, despite their differing epidemiological and socio-economic contexts. This article provides a comparative analysis of the TB burden, healthcare infrastructure, and control measures in both countries. It highlights the drawbacks in current strategies and provides recommendations for improvement. Data from the World Health Organization (WHO), national health ministries, and peer-reviewed journals are used to provide the latest insights. The analysis underscores the need for strengthened healthcare systems, increased funding, and international collaboration to achieve the global goal of TB elimination.

Keywords: tuberculosis, India, Kyrgyzstan, healthcare infrastructure, TB control

ИНДИЯ ЖАНА КЫРГЫЗСТАНДАГЫ ТУБЕРКУЛЕЗ: САЛЫШТЫРМАЛУУ АНАЛИЗ ЖАНА ЖАКШЫРТУУ СУНУШТАРЫ

ТУБЕРКУЛЕЗ В ИНДИИ И КЫРГЫЗСТАНЕ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ И РЕКОМЕНДАЦИИ ПО УЛУЧШЕНИЮ

Аннотация

Туберкулез (ТБ) Индия жана Кыргызстанда социалдык-экономикалык жана эпидемиологиялык шарттарына карабастан, коомдук саламаттыкты сактоо боюнча чоң көйгөй болуп сакталууда. Бул макалада эки өлкөдөгү ТБ жүктөлүшү, саламаттыкты сактоо инфраструктурасы жана көзөмөлдөө чаралары салыштырмалуу талдоо берилет. Учурдагы стратегиялардын жетишсиздиктери баса көрсөтүлүп, жакшыртуу сунуштары берилет. Дүйнөлүк саламаттыкты сактоо уюму (ДССУ), улуттук саламаттыкты сактоо министрликтери жана эксперттер тарабынан каралган журналдардын акыркы маалыматтары колдонулган. Талдоо ТБди жоюунун глобалдык максатына жетүү үчүн саламаттыкты сактоо системасын бекемдөө, каржылоону көбөйтүү жана эл аралык кызматташтыктын зарылдыгын баса көрсөтөт.

Abstract

Туберкулез (ТБ) ошол эле сөз менен серьезной проблемой общественного здравоохранения в Индии и Кыргызстане, несмотря на их различные эпидемиологические и социально-экономические контексты. В этой статье представлен сравнительный анализ бремени ТБ, инфраструктуры здравоохранения и мер контроля в обеих странах. В ней выделены недостатки текущих стратегий и предложены рекомендации по улучшению. Используются данные Всемирной организации здравоохранения (ВОЗ), национальных министерств здравоохранения и рецензируемых журналов для предоставления последних данных. Анализ подчеркивает необходимость укрепления систем здравоохранения, увеличения финансирования и международного сотрудничества для достижения глобальной цели ликвидации ТБ.

Ачкыч сөздөр: туберкулез, Индия, Кыргызстан, саламаттыкты сактоо инфраструктурасы, ТБди көзөмөлдөө, сунуштар, коомдук саламаттыкты сактоо

Keywords: туберкулез, Индия, Кыргызстан, инфраструктура здравоохранения, контроль ТБ, рекомендации, общественное здравоохранение

Introduction

Tuberculosis (TB) continues to be a major global health challenge, contributing significantly to morbidity and mortality worldwide. While the global fight against TB has made substantial progress over the years, countries with high TB burdens continue to face formidable obstacles. Among these, India and Kyrgyzstan are at the forefront of the epidemic, each with distinct challenges in controlling TB. India bears the brunt of the global TB burden, while Kyrgyzstan faces a particularly high rate of drug-resistant TB (DR-TB). This article aims to provide a comparative analysis of the TB situation in these two countries, focusing on key areas such as epidemiology, healthcare infrastructure, national policies, and recommendations for improved control. By leveraging the latest data from authoritative sources such as the World Health Organization (WHO), national health ministries, and peer-reviewed literature, the study aims to identify gaps and offer solutions that could help mitigate the TB crisis in both nations.

Kyrgyzstan is a developing country with widespread poverty and significant socio-economic inequality. As a result, migration is increasing as citizens seek better opportunities. While health is influenced by various factors, many neglect a healthy lifestyle. Despite efforts by TB services, tuberculosis remains a growing concern. According to the National Center of Phthisiology, after a sharp decline in cases in 2020–2021, incidence slightly increased in 2022, with 4,018 cases (60 per 100,000 people) compared to 3,891 (58.1 per 100,000) in 2021 and 3,518 (53.5 per 100,000) in 2020. (Boronbayeva A. A., et. all., 2024, 63-69). Dzholdubaev's research revealed that among 345 patients with pulmonary pathology, the majority (86.9% or 300 patients) had chronic nonspecific lung diseases, followed by those with tuberculosis (Dzholdubaev, Y. D., & Zakirova, T. A., 2014, pp. 47–50).

India, home to the largest TB burden in the world, accounts for approximately 27% of global TB cases (WHO, 2023). The country faces the compounded challenge of multidrug-resistant TB (MDR-TB), with significant morbidity and mortality due to delayed diagnosis, inadequate treatment adherence, and socio-economic factors such as poverty and overcrowding. In contrast, Kyrgyzstan, with a much smaller population, suffers from a similarly high incidence of drug-resistant TB, with alarming rates of MDR-TB, particularly among previously treated cases. The burden of TB in Kyrgyzstan is exacerbated by its mountainous geography and the challenges posed by limited healthcare access in rural and remote areas.

This article will compare the epidemiological data, healthcare system capabilities, and policy approaches to TB control in both countries. It will also discuss the challenges encountered in the implementation of national TB programs and propose strategic recommendations to enhance TB control efforts. This comparison aims to offer valuable insights for improving TB management strategies, not only in India and Kyrgyzstan but also in other high-burden countries.

By focusing on epidemiological indicators, healthcare infrastructure, control policies, and existing gaps, this study will provide a comprehensive overview of the TB burden in both nations, shedding light on the global effort to achieve TB elimination by 2035, as outlined by the WHO's End TB Strategy.

Methods

This study compares tuberculosis (TB) in India and Kyrgyzstan, focusing on epidemiology, healthcare systems, policies, and control measures. A review of available literature was carried out by searching within a number of databases, including WHO, national health ministries, and academic research and scientific database PubMed, Medline, Scopus and Google scholar (Table 1).

Table 1. Data collection and databases

Data Collection:	Epidemiology:	TB incidence, mortality, and drug-resistant cases from WHO and national reports.
	Healthcare Infrastructure:	Availability of TB clinics, diagnostic facilities, and healthcare access.
	Policies & Programs:	National TB control strategies, including India's TB Elimination Plan and Kyrgyzstan's National TB Program.
	Challenges & Solutions:	Issues like underreporting, misdiagnosis, stigma, financial constraints, and geographical barriers were examined.
Comparative Analysis:	Epidemiology:	TB burden and drug resistance compared.
	Healthcare Access:	Differences in India's large healthcare network vs. Kyrgyzstan's centralized TB clinics.
	Policy Effectiveness:	Success of TB control programs in early detection, treatment, and drug resistance management.

Results and Discussion

Epidemiology of Tuberculosis

India

- India accounts for 27% of the global TB burden, with an estimated 2.8 million cases reported in 2022 (World Health Organization [WHO], 2023, p. 12).
- The incidence rate is 199 cases per 100,000 population, with a mortality rate of 35 deaths per 100,000 population (WHO, 2023, p. 15).
- Multidrug-resistant TB (MDR-TB) is a significant concern, with 124,000 cases reported in 2022 (WHO, 2023, p. 18).
- The prevalence of TB is higher in urban areas due to overcrowding and poor living conditions (Ministry of Health and Family Welfare, India, 2023, p. 10).
- India has a high burden of TB-HIV co-infection, with 5% of TB patients also living with HIV (Central TB Division, India, 2023, p. 7).

Kyrgyzstan

- Kyrgyzstan is classified as a high-TB-burden country, with an estimated 5,500 TB cases reported in 2022 (WHO, 2023, p. 22).

- The incidence rate is 81 cases per 100,000 population, with a mortality rate of 10 deaths per 100,000 population (WHO, 2023, p. 24).
- Drug-resistant TB is a critical issue, with 28% of new TB cases and 60% of previously treated cases being drug-resistant (WHO, 2023, p. 26).
- The burden of TB is higher in rural and mountainous regions due to limited healthcare access (Ministry of Health, Kyrgyzstan, 2023, p. 5).
- Kyrgyzstan has a lower TB-HIV co-infection rate compared to India, with 2% of TB patients living with HIV (National Statistical Committee, Kyrgyzstan, 2023, p. 9).

Table 2 demonstrates that India has a significantly higher TB burden compared to Kyrgyzstan, with higher incidence and mortality rates. However, Kyrgyzstan faces a higher proportion of drug-resistant TB cases.

Table 2. Epidemiological Comparison of TB in India and Kyrgyzstan (2022)

Indicator	India	Kyrgyzstan
Total TB Cases	2.8 million	5,500
Incidence rate per (100,000)	199	81
Mortality rate (per 100,000)	35	10
MDR-TB Cases	124,000	1,540
TB-HIV Co-infection	5%	2%
Source	WHO (2023, p.12)	WHO (2023, p.12)

Healthcare Infrastructure and Access

India

- India has a vast network of healthcare facilities, including 1.5 million health sub-centers and 50,000 primary health centers providing TB care (National Health Mission [NHM], 2023, p. 8).
- The National Strategic Plan for TB Elimination (2017-2025) aims to eliminate TB by 2025, focusing on early diagnosis, treatment, and prevention (Ministry of Health and Family Welfare, India, 2023, p. 10).
- Challenges include underreporting, stigma, and limited access to healthcare in rural areas (WHO, 2023, p. 30).
- The government has introduced mobile health units to reach remote populations (NHM, 2023, p. 12).
- India has also implemented public-private partnerships to improve TB case notification and treatment adherence (Central TB Division, India, 2023, p. 15).

Kyrgyzstan

- Kyrgyzstan has a well-established network of TB clinics, with 100% coverage of diagnostic and treatment services (Ministry of Health, Kyrgyzstan, 2023, p. 5).
- The country has adopted the End TB Strategy, emphasizing early diagnosis and treatment of drug-resistant TB (WHO, 2023, p. 28).

- Financial constraints and geographical barriers in mountainous regions remain significant challenges (WHO, 2023, p. 32).
- International organizations like the Global Fund and WHO provide financial and technical support for TB control (WHO, 2023, p. 36).
- Kyrgyzstan has introduced community-based TB care to improve access in remote areas (Ministry of Health, Kyrgyzstan, 2023, p. 7).

Table 3 shows that India has a larger healthcare infrastructure, but Kyrgyzstan achieves higher diagnostic coverage due to its centralized TB clinics.

Table 3: Healthcare Infrastructure Comparison

Indicator	India (NHM (2023, p. 8)	Kyrgyzstan (Ministry of Health, Kyrgyzstan (2023, p. 5))
Health Sub- centres	1.5 million	Not applicable
Primary Health centres	50,000	200 TB clinics
Diagnostic Coverage	85%	100%

TB Control Measures and Policies

India

- The Nikshay Poshan Yojana provides nutritional support to TB patients through direct benefit transfers (Ministry of Health and Family Welfare, India, 2023, p. 12).
- The Revised National TB Control Program (RNTCP) has introduced advanced diagnostic tools like CBNAAT (Cartridge-Based Nucleic Acid Amplification Test) and GeneXpert for early detection (NHM, 2023, p. 10).
- India has also launched the TB-Free India Campaign to raise awareness and reduce stigma (Ministry of Health and Family Welfare, India, 2023, p. 14).
- The government is working with private healthcare providers to improve case notification and treatment adherence (WHO, 2023, p. 34).
- India has introduced daily drug regimens to replace intermittent therapy, improving treatment outcomes (Central TB Division, India, 2023, p. 18).

Kyrgyzstan

- Kyrgyzstan has implemented the National TB Program, which focuses on improving diagnostic capacity and treatment adherence (Ministry of Health, Kyrgyzstan, 2023, p. 7).
- The country has introduced community-based TB care to improve access in remote areas (WHO, 2023, p. 34).
- Kyrgyzstan has also adopted universal drug susceptibility testing to address drug-resistant TB (WHO, 2023, p. 36).
- The government collaborates with international organizations to secure funding and technical assistance (Ministry of Health, Kyrgyzstan, 2023, p. 9).
- Kyrgyzstan has implemented social support programs for TB patients, including food packages and transportation subsidies (National Statistical Committee, Kyrgyzstan, 2023, p. 12).

Drawbacks in TB Control Programs

India

- Underreporting and Misdiagnosis: Many TB cases go unreported, especially in rural areas, due to limited diagnostic facilities (Central TB Division, India, 2023, p. 20).
- Stigma and Discrimination: Social stigma prevents patients from seeking timely treatment (Ministry of Health and Family Welfare, India, 2023, p. 16).
- Inadequate Funding: Despite government efforts, funding for TB control remains insufficient to meet the growing demand (WHO, 2023, p. 38).
- Inequitable Access: Rural and marginalized populations face barriers in accessing healthcare services (NHM, 2023, p. 14).

Kyrgyzstan

- Financial Constraints: Limited domestic funding hampers the scale-up of TB control programs (Ministry of Health, Kyrgyzstan, 2023, p. 10).
- Geographical Barriers: Remote and mountainous regions lack adequate healthcare infrastructure (WHO, 2023, p. 40).
- Drug Resistance: High rates of MDR-TB and limited access to second-line drugs remain critical challenges (National Statistical Committee, Kyrgyzstan, 2023, p. 15).
- Dependency on Donor Funding: Over-reliance on international donors makes the program vulnerable to funding fluctuations (WHO, 2023, p. 42).

Recommendations for Improvement

India

- Strengthen Diagnostic Networks: Expand the coverage of advanced diagnostic tools like CBNAAT and GeneXpert to rural areas (Central TB Division, India, 2023, p. 22).
- Address Stigma: Launch nationwide awareness campaigns to reduce stigma and encourage early treatment-seeking behavior (Ministry of Health and Family Welfare, India, 2023, p. 18).
- Increase Funding: Allocate more domestic resources to TB control programs and explore innovative financing mechanisms (WHO, 2023, p. 44).
- Enhance Public-Private Partnerships: Strengthen collaboration with private healthcare providers to improve case notification and treatment adherence (NHM, 2023, p. 16).

Kyrgyzstan

- Improve Domestic Funding: Increase government spending on TB control to reduce dependency on international donors (Ministry of Health, Kyrgyzstan, 2023, p. 12).
- Expand Healthcare Infrastructure: Build more TB clinics in remote and mountainous regions to improve access (WHO, 2023, p. 46).
- Strengthen Drug-Resistance Management: Ensure universal access to second-line drugs and improve treatment adherence (National Statistical Committee, Kyrgyzstan, 2023, p. 18).
- Leverage Technology: Use telemedicine and mobile health units to reach underserved populations (Ministry of Health, Kyrgyzstan, 2023, p. 14).

Conclusion

Tuberculosis remains a critical public health issue in India and Kyrgyzstan. While India faces a high burden of TB cases, Kyrgyzstan struggles with drug resistance. Both countries have implemented robust policies and programs, but sustained efforts and international collaboration are essential to overcome the challenges and achieve TB elimination. Addressing the drawbacks and implementing the recommendations outlined in this article can significantly improve TB control in both countries.

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