

Epidemiological Transition and Health Outcomes in Tripura, India: A Review

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Abstract: Background: Tripura, a northeastern state of India, is experiencing epidemiological transition characterized by demographic change and a shifting disease burden. Objectives: To analyze demographic trends, health indicators, and disease patterns in Tripura using secondary data within the framework of epidemiological transition. Materials and Methods: A narrative review of secondary data from National Family Health Survey (NFHS-4 and NFHS-5), Census of India, Government of India reports, and peer-reviewed literature (2010-2024) was conducted. Data were synthesized under demographic transition, maternal and child health, communicable diseases, and non-communicable diseases (NCDs). Results: Tripura has achieved sub-replacement fertility (TFR 1.7) and high literacy (87.8%). Institutional deliveries improved to 89% (NFHS-5). However, childhood stunting (32.3%) and anemia among women (67.4%) increased. Communicable diseases such as malaria and tuberculosis remain endemic, while hypertension (20-25%), diabetes (8-10%), and overweight/obesity (~28%) indicate a rising NCD burden. Conclusion: Tripura demonstrates a dual burden of disease with persistent maternal-child health challenges and increasing NCD prevalence. Integrated, equity-oriented primary healthcare strategies are essential to address emerging health needs.

Keywords: Epidemiological transition, non-communicable diseases, Maternal health, Disease burden, public health

1. Introduction

The theory of epidemiological transition describes the shift in disease patterns from infectious diseases and nutritional deficiencies to chronic and degenerative diseases as populations undergo demographic and socioeconomic development.[1] India currently exhibits a prolonged transitional phase marked by the coexistence of communicable diseases and rising non-communicable diseases (NCDs). [2]

Sub-national variations in epidemiological transition are substantial across Indian states. [2, 9] Tripura, a northeastern state with improving literacy and fertility decline, provides an important case for examining these changes. Despite improvements in healthcare access, maternal and nutritional challenges persist alongside rising chronic diseases.

This review analyzes demographic change, health indicators, and disease patterns in Tripura using secondary data within the epidemiological transition framework.

2. Review of Literature

The concept of epidemiological transition was introduced by Abdel Omran, describing the shift from infectious and deficiency diseases to chronic and degenerative conditions as societies develop. In India, the India State-Level Disease Burden Initiative highlighted wide interstate variations in this transition, showing that communicable and non-communicable diseases coexist in many regions. Reports published in The Lancet emphasized the growing dominance of NCDs alongside

persistent maternal and infectious health challenges. The Indian Council of Medical Research documented increasing prevalence of cardiovascular diseases, diabetes, and metabolic risk factors nationwide.

Data from the National Family Health Survey indicate improvements in fertility, institutional deliveries, and healthcare access, but persistent undernutrition and anemia among women. The Census of India reports rising literacy and demographic stabilization in northeastern states. Despite progress, communicable diseases such as malaria and tuberculosis remain concerns, as noted by the National Center for Vector Borne Diseases Control and the Central TB Division. HIV prevalence, reported by the National AIDS Control Organization, remains relatively low but persistent in the region. In Tripura, sub-replacement fertility and improved maternal healthcare coexist with high stunting and anemia levels. Emerging evidence also indicates rising hypertension, diabetes, and obesity, reflecting a dual burden of disease within the broader framework of epidemiological transition.

3. Materials and Methods

This narrative review utilized secondary data from:

- National Family Health Survey (NFHS-4, 2015-16; NFHS-5, 2019-21) [3]
- Census of India 2011[4]
- National health program reports (TB, HIV, vector-borne diseases) [5-7]
- Indian Council of Medical Research (ICMR) reports [8]
- Peer-reviewed literature (2010-2024)

Data were thematically synthesized under demographic transition, maternal and child health, communicable diseases, and NCDs.

4. Results

Demographic Transition

Tripura has entered an advanced demographic transition stage with declining fertility and improved literacy.

Table 1: Demographic Indicators of Tripura

Indicator	Value	Source
Total Fertility Rate (TFR)	1.7	NFHS-5 [3]
Literacy Rate (%)	87.8	Census 2011 [4]
Sex Ratio (females per 1000 males)	960	Census 2011 [4]
Decadal Population Growth Rate (%)	26.2	Census 2011 [4]

Sub-replacement fertility indicates population stabilization and gradual aging, which has implications for chronic disease burden.

Maternal and Child Health

Healthcare utilization indicators have improved; however, nutritional outcomes show deterioration.

Table 2: Maternal and child health indicators in Tripura

Indicator	NFHS-4 (%)	NFHS-5 (%)	Source
Institutional Deliveries	82	89	NFHS [3]
Children <5 Years Stunted	24.3	32.3	NFHS [3]
Women (15-49 years) Anemic	54.5	67.4	NFHS [3]

The increase in stunting and anemia indicates persistent nutritional deprivation despite improved service utilization.

Communicable Diseases

Tripura continues to experience endemic vector-borne diseases and tuberculosis.

Table 3: Selected communicable diseases in Tripura

Disease	Epidemiological Status	Source
Malaria	Endemic, declining trend	NVBDCP [5]
Tuberculosis	Moderate burden	India TB Report [6]
HIV Prevalence (%)	~0.33	NACO [7]

Environmental vulnerability and cross-border mobility contribute to infectious disease persistence.

Non-Communicable Diseases

NCDs are emerging as significant contributors to morbidity.

Table 4: Prevalence of selected NCDs

Condition	Estimated Prevalence (%)	Source
Hypertension	20-25	ICMR [8]
Diabetes	8-10	ICMR [8]
Overweight/Obesity (Adults)	~28	NFHS-5 [3]

Lifestyle changes, dietary transition, tobacco use, and aging are key contributors.

5. Discussion

Tripura demonstrates characteristics of late epidemiological transition: declining fertility, improving healthcare access, and rising chronic diseases. However, persistent childhood malnutrition and anemia reflect unfinished public health agendas.

The coexistence of communicable diseases and increasing NCD prevalence represents a dual burden typical of transitional states. [2, 9] Additionally, the simultaneous presence of undernutrition and overweight suggests a double burden of malnutrition.

Policy priorities should include:

- Strengthening comprehensive primary healthcare.
- Integrating NCD screening into routine services.
- Enhancing nutrition-specific and nutrition-sensitive interventions.
- Improving surveillance for infectious diseases.
- Targeting tribal and rural populations to reduce inequities.

6. Limitations

The review relies on secondary data sources with potential methodological variations. Limited district-level longitudinal data restricts causal interpretation.

7. Conclusion

Tripura is undergoing a clear epidemiological transition marked by demographic change and evolving disease patterns. While institutional healthcare utilization has improved, maternal and nutritional challenges persist alongside a rising burden of NCDs. Integrated, preventive, and equity-focused public health strategies are essential to sustain health gains.

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