# Barriers to Early Cancer Diagnosis in India: (A Systematic Review of Patient, Provider, and Health System Level Factors Amid Persistently High Late-Stage Presentation)

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**DOI: https://doi.org/10.51244/IJRSI.2026.1304000263**

**Received: 18 April 2026; Accepted: 23 April 2026; Published: 20 May 2026**

## ABSTRACT

Cancer remains a major public health challenge in India, with a persistently high proportion of patients presenting at advanced stages of disease. This contributes to reduced survival outcomes, increased treatment costs, and substantial socioeconomic burden on households and the health system.

This systematic narrative review synthesizes evidence on barriers to early cancer diagnosis in India across patient, provider, and health system levels. A structured literature search was conducted using PubMed, Google Scholar, Embase, WHO reports, and selected LMIC studies published between 2005 and 2025. Studies addressing diagnostic delay, stage at presentation, and barriers to early detection were included.

The findings demonstrate that diagnostic delay arises from interacting determinants across three levels. At the patient level, low awareness, stigma, cultural beliefs, and financial constraints delay initial healthcare seeking. At the provider level, low clinical suspicion, misdiagnosis, and inadequate oncology training contribute to delayed referral. At the health system level, inadequate diagnostic infrastructure, workforce shortages, fragmented referral pathways, and urban concentration of cancer services further prolong time to diagnosis. Rural populations are disproportionately affected, with consistently higher rates of Stage III–IV presentation.

This review concludes that late-stage cancer diagnosis in India is primarily a structural health system problem requiring integrated reforms in primary care strengthening, diagnostic capacity expansion, referral system integration, and financial protection mechanisms.

**Keywords:** Cancer India, diagnostic delay, late-stage presentation, primary healthcare, health systems, oncology access, LMIC, systematic narrative review

## INTRODUCTION

Cancer is among the leading causes of mortality in India, with a steadily increasing burden driven by demographic transition, aging population, environmental exposures, and lifestyle changes. Despite improvements in cancer treatment infrastructure, late-stage presentation remains a dominant feature of cancer epidemiology.

Evidence indicates that approximately 50–70% of cancer patients in India present at Stage III or IV, particularly in breast, cervical, oral, and lung cancers (1–4). Late diagnosis significantly reduces the likelihood of curative treatment and increases both direct and indirect economic burden.

The cancer diagnostic pathway involves sequential stages: symptom recognition, first healthcare contact, referral, diagnostic confirmation, and treatment initiation. Delay at any stage contributes cumulatively to advanced disease at presentation.

**Delays are broadly categorized into:**

- Patient delay
- Provider delay
- Health system delay

Understanding the interaction between these levels is essential for designing effective interventions to improve early cancer detection in India.

**Fig: 1 Conceptual Framework of Delayed Cancer Diagnosis in India**

**Patient level**

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**Low awareness + stigma + financial barriers**

↓

**Delayed first healthcare contact**

**Provider level**

↓

**Low suspicion + misdiagnosis + weak referral**

↓

**Delayed diagnosis suspicion**

**System level**

↓

**Poor infrastructure + workforce shortage + fragmentation**

↓

**Delayed confirmation & treatment**

**Final outcome**

↓

**Late-stage cancer presentation (stage iii–iv)**

# METHODS

## Study Design

This study adopted a systematic narrative review design following PRISMA-guided principles for structured evidence synthesis. Given the heterogeneity of included studies, meta-analysis was not feasible.

## Data Sources

A structured search was conducted in PubMed, Google Scholar, Embase, WHO reports, and relevant LMIC literature using keywords such as *"*cancer diagnostic delay India," "late-stage cancer presentation,*"* and "health system barriers.*"* Studies published between 2005 and 2025 were included.

## Inclusion Criteria

- Studies conducted in India or comparable LMIC settings
- Studies addressing cancer diagnostic delay or stage at diagnosis
- Qualitative, quantitative, and systematic reviews

## Exclusion Criteria

- Non-cancer-related studies
- Studies not reporting diagnostic delay or stage data
- Treatment-only outcome studies

## Data Synthesis

Data were analyzed thematically and grouped into patient, provider, and health system barriers.

## Results: Barriers to Early Cancer Diagnosis

**Patient-Level Barriers:** Delayed presentation at the patient level is primarily driven by sociocultural, economic, and informational factors. Low awareness of early cancer symptoms remains widespread, particularly in rural populations. Common symptoms such as persistent cough, oral lesions, breast lumps, and unexplained weight loss are often not recognized as serious warning signs (1,5,7). Cancer-related stigma and fear of diagnosis contribute to denial and avoidance of medical consultation. In many communities, cancer is perceived as incurable, leading patients to delay formal healthcare and initially seek informal or traditional care systems (7,9). Financial constraints represent a major barrier. High out-of-pocket expenditure, combined with indirect costs such as travel and wage loss, significantly delay care-seeking, particularly among low-income households (2,5,10). Symptom misinterpretation is also common, with early signs often considered minor or self-limiting (3,6). Additionally, gender and social inequality further delay care among women due to reduced autonomy and caregiving responsibilities (2,10).

**Provider-Level Barriers:** Provider-related delays are primarily driven by limitations in clinical training, diagnostic suspicion, and referral systems. Low index of suspicion among primary care providers results in misdiagnosis or symptomatic treatment without further investigation (3,6,11). Limited exposure to oncology and lack of standardized early detection protocols contribute to missed diagnostic opportunities (4,11). Referral systems are often fragmented, resulting in multiple consultations before specialist evaluation (3,6). Communication gaps between providers and patients further reduce adherence to referral advice and delay diagnostic progression (5,9).

**Health System-Level Barriers:** System-level barriers represent the most structurally significant determinants of delayed diagnosis. Diagnostic infrastructure is unevenly distributed, with rural and district-level facilities lacking imaging, pathology, and biopsy services (3,6,12). This leads to delayed confirmation of suspected cancer cases. Cancer care is heavily concentrated in urban tertiary centers, requiring long-distance travel and increasing

both financial and time burden (2,4). India's mixed public–private healthcare system is fragmented, resulting in poor continuity of care and inefficient patient navigation (6,11). Workforce shortages, particularly of oncologists and pathologists in rural areas, further exacerbate delays (5,12). Even after diagnosis, delays in treatment initiation contribute to disease progression and worsen outcomes (4,6).

**Integrated Model of Late-Stage Presentation**

Late-stage cancer diagnosis is best understood as a cumulative process of delay across multiple levels, rather than a single factor.

| Level | Key Barrier | Outcome |
|---|---|---|
| Patient | Low awareness, stigma | Delayed first consultation |
| Provider | Misdiagnosis, low suspicion | Delayed referral |
| System | Poor infrastructure | Delayed diagnosis |

This interaction explains the high burden of advanced-stage cancer presentation in India (2,4,10).

**Evidence from Existing Reviews**

Previous LMIC studies consistently show that poverty, low education, and cultural beliefs significantly contribute to delayed diagnosis (6,8,13). Weak health systems and lack of structured screening programs further worsen outcomes.

Global evidence demonstrates that organized screening programs can reduce late-stage presentation, but implementation remains limited in LMIC settings (13,14).

**Fig 02: Stages of Diagnostic Delay in Cancer Care Pathway**

| Stage of Care Pathway | Description | Common Delay Factors |
|---|---|---|
| Symptom recognition | Symptom recognition | Symptom recognition |
| First consultation | First consultation | First consultation |
| Referral stage | Referral stage | Referral stage |
| Diagnosis confirmation | Diagnosis confirmation | Diagnosis confirmation |
| Treatment initiation | Treatment initiation | Treatment initiation |

## DISCUSSION

Late-stage cancer diagnosis in India reflects **a** systemic health system challenge rather than individual-level failure. Delays occur across the entire care continuum and are shaped by interacting social, clinical, and structural factors (1–6).

**Patient delay is only part of the problem**

While awareness influences health-seeking behavior, structural factors such as affordability, access, and availability of services play a much larger role in determining diagnosis timelines (2,10). Many patients seek informal care first due to accessibility and cost constraints.

**Primary care remains a critical bottleneck**

Primary care providers often lack training and diagnostic support, resulting in missed early cancer signs and delayed referrals (4,11). Strengthening primary care capacity is therefore central to improving early detection.

**Fragmentation of healthcare delivery**

The lack of coordination between public and private sectors leads to repeated consultations, duplication of tests, and inefficient patient pathways (6,12).

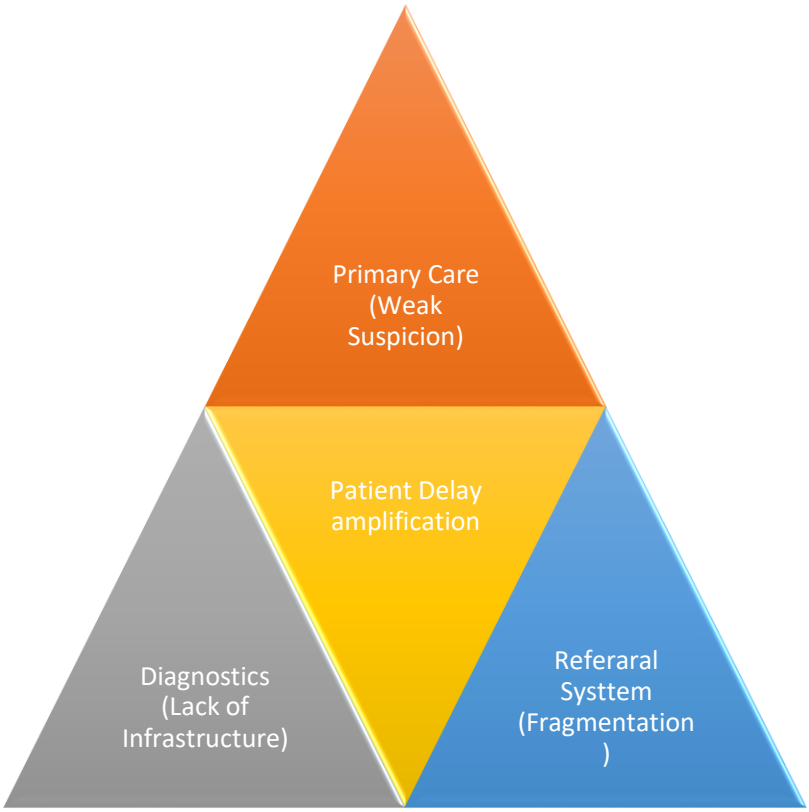


**Fig 03: Health System Bottleneck Model**

**Rural–urban disparities**

Rural populations face multiple disadvantages including poor access to diagnostics, long travel distances, and limited financial resources, resulting in delayed diagnosis and poorer outcomes (2,3).

**Need for structural reform**

Sustainable improvement requires system-wide reforms including stronger primary care, decentralized diagnostics, improved referral systems, and financial protection. Awareness campaigns alone are insufficient without structural support (11,14).

These findings are consistent with WHO's framework on timely cancer diagnosis, which emphasizes health system responsiveness as a key determinant of survival outcomes in LMICs.

**Future Research Directions**

Future research should prioritize the inclusion of region-specific and rural data to better capture India's diverse healthcare landscape and reduce geographic bias in existing evidence (2,3,12). A large proportion of current literature is hospital-based and urban-centric, which limits generalizability to underserved populations.

There is also a critical need for standardization of study designs, definitions of diagnostic delay, and outcome measures (6,13). Improved methodological consistency would enhance comparability across studies and enable more robust evidence synthesis, including meta-analyses where feasible.

Additionally, future studies should incorporate recent data to assess the impact of evolving national cancer control programs, screening initiatives, and emerging digital health interventions on early diagnosis pathways (4,14). Particular attention should be given to understanding cultural, behavioral, and gender-related determinants that shape health-seeking behavior, especially in rural and socioeconomically disadvantaged populations (2,7,8,10).

**Policy Implications**

**Strengthening primary healthcare**

Primary care systems must be strengthened through structured training in early cancer recognition, standardized referral pathways, and integration of decision-support tools to improve diagnostic suspicion and timely referral (4,11).

**Expanding and integrating screening programs**

Organized screening programs for breast, cervical, and oral cancers should be fully integrated into primary healthcare services, with robust follow-up and tracking mechanisms to ensure continuity of care (5,13).

**Improving diagnostic infrastructure and accessibility**

Expansion of district-level diagnostic facilities, mobile screening units, and decentralization of pathology and imaging services are essential to improve access in rural and underserved areas (3,12).

**Community-based awareness and behavioral interventions**

Policymakers should prioritize culturally sensitive, community-based awareness programs that address stigma, improve symptom recognition, and promote timely healthcare seeking, particularly among vulnerable populations (7,8).

**Financial protection and affordability**

Health financing strategies must expand coverage to include diagnostic services such as imaging and biopsy, reducing out-of-pocket expenditure and enabling earlier access to care (10,14).

**Strengthening referral systems and care integration**

Efficient and coordinated referral systems between primary, secondary, and tertiary care levels are essential to reduce fragmentation and delays in diagnosis (6,11,12).

**Limitations**

This review has several limitations. First, it is a narrative systematic review rather than a meta-analysis, limiting quantitative synthesis. Second, included studies are heterogeneous in design, population, and cancer type, which limits comparability. Third, publication bias may overrepresent hospital-based evidence, underestimating community-level delays. Fourth, limited inclusion of regional-language literature may restrict representation of rural experiences. Finally, most studies are cross-sectional, limiting causal interpretation of findings.

## CONCLUSION

Late-stage cancer diagnosis in India is a complex, multi-level challenge driven by interacting patient, provider

and health system barriers (1–6). It reflects structural inequities in access, infrastructure, and health system organization rather than individual behavior alone.

Addressing this issue requires integrated and sustained reforms, including strengthening primary healthcare, expanding diagnostic capacity, improving referral coordination, and ensuring financial protection (4,10,11,14). Future efforts must also incorporate region-specific evidence, standardized research approaches, and updated data to better inform policy and practice (2,3,6).

Without systemic transformation, advances in cancer treatment alone will not substantially improve outcomes. Early detection must be embedded as a central pillar of cancer control strategies, supported by an equitable, accessible, and responsive health system (13,14).

## REFERENCES

1. Naidu CK, et al. Factors associated with delayed cancer diagnosis in India: evidence from population studies. Asian Pac J Cancer Prev. 2021. DOI:10.31557/APJCP.2021.22.5.1451
2. Nagar A, et al. Barriers to cancer diagnosis and treatment in rural India: a qualitative study. Cureus. 2024. DOI: 10.7759/cureus.67249 PMCID: PMC11412281
3. Halder P, et al. Delays in cancer care pathways in South and Southeast Asia. Lancet Reg Health Southeast Asia. 2024. DOI: 10.1016/j.lansea.2024.100514
4. Sahu KS, et al. Awareness and health-seeking behavior for cancer symptoms in rural India. Indian J Community Med. 2025. DOI: 10.4103/ijcm.ijcm_195_23
5. Rai B, et al. Breast cancer stage at diagnosis and associated delays in India. Asian Pac J Cancer Prev. 2022. DOI: 10.31557/APJCP.2022.23.3.893
6. World Health Organization. Early cancer diagnosis: guiding principles for effective programmes. Geneva: WHO; 2021. DOI: Not assigned (WHO report)
7. Ferlay J, et al. Global cancer statistics 2020: GLOBOCAN estimates. CA Cancer J Clin. 2021. DOI: 10.3322/caac.21660
8. Bray F, et al. Global cancer statistics 2022: GLOBOCAN update. CA Cancer J Clin. 2024. DOI: 10.3322/caac.21834
9. Pramesh CS, et al. Cancer care in India: current status and challenges. Lancet Oncol. 2014. DOI: 10.1016/S1470-2045(14)70122-7
10. Takiar R, et al. Cancer burden in India and health system challenges. Indian J Cancer. 2016. DOI: 10.4103/0019-509X.197709
11. Sharma DC. Cancer care in India: gaps in early detection and diagnosis. Lancet Oncol. 2012. DOI: 10.1016/S1470-2045(12)70224-4
12. Sankaranarayanan R, et al. Cancer prevention and early detection in LMICs. Lancet. 2019. DOI: 10.1016/S0140-6736(19)30539-0
13. Denny L, et al. Cervical cancer screening in LMICs: evidence and strategies. Lancet Glob Health. 2023. DOI: 10.1016/S2214-109X(23)00012-8
14. Ginsburg O, et al. The global burden of cancer diagnosis delays. Lancet Oncol. 2020. DOI: 10.1016/S1470-2045(20)30313-1