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Information Asymmetry in Healthcare: A Comprehensive Systematic Review of Evidence and Implications

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ABSTRACT

Background: Information asymmetry—the unequal distribution of relevant information between stakeholders in healthcare transactions resulting into a foundational market failure that affects utilization, spending, quality, and equity. Information asymmetry is an accepted fact but its scope of impact and area remain fragmented. This empirical study is an effort to identify the same by doing empirical synthesis of previous research work.

Objective: To systematically review empirical and theoretical literature on information asymmetry in healthcare and synthesize evidence concerning its impacts on costs, quality of care, insurance markets, patient autonomy, and safety.

Methods: Following PRISMA 2020 guidelines, we merged two curated datasets (Scopus indexed and PubMed data bases), removed duplicates (initial combined records n = 92), and performed keyword-based screening to identify studies addressing information asymmetry, moral hazard, adverse selection, supplier-induced demand, transparency, and related constructs. Following title/abstract screening and full-text assessment, 27 studies fulfilled the inclusion criteria. Data extraction captured study design, setting, asymmetry type, outcomes examined, and principal findings. A structured narrative synthesis was performed due to heterogeneity in designs and outcomes.

Results: Included studies comprised of different approaches as theoretical models, empirical quantitative analyses, qualitative investigations, and mixed-methods studies spanning from high-, middle-, and low-income settings. Evidence indicates that information asymmetry contributes to supplier-induced demand and resource overuse (Hall et al., 2025; Yue et al., 2025), market distortions in insurance through adverse selection and moral hazard (Hall et al., 2025; Bi et al., 2025), reduced patient autonomy and shared decision-making (Cabanes et al., 2025; Huang et al., 2025), variability and opacity of quality permitting low-quality providers to persist (Shih et al., 2025; Xu et al., 2025), and suboptimal safety and public health outcomes through miscommunication and misinformation (Ma et al., 2025; Madzorera et al., 2025). Interventions reported or suggested to mitigate asymmetry include transparency initiatives, decision aids, provider performance reporting, digital health records, and demand-side health literacy programs; however, empirical evidence on effectiveness is limited and context-dependent (Yue et al., 2025; Huang et al., 2025; Cabanes et al., 2025).

Conclusions: Information asymmetry plays major role in inefficiency, inequity, and diminished safety in healthcare. Multi-pronged policy responses—improving transparency, strengthening regulatory oversight, enabling patient-centered decision-making, and leveraging health information technology—are necessary to address this problem. Future research should prioritize controlled evaluations of mitigation strategies and comparatives across health system types.

Keywords: *information asymmetry, supplier-induced demand, moral hazard, adverse selection, transparency, shared decision-making, health literacy, systematic review, PRISMA.*

1. INTRODUCTION

Markets for health services are grossly different from standard commodity markets due to uncertainty and variable responses amongst individuals for any clinical interventions and largely due to information asymmetry as providers often possess substantially more knowledge than patients about diagnoses, treatment options, and likely outcomes (Arrow, 1963; see empirical illustrations in Cabanes et al., 2025; Yue et al., 2025). This asymmetry leads to classic economic problems—moral hazard, adverse selection, and supplier-induced demand—that distort utilization and increase costs while undermining equity and quality (Hall et al., 2025; Bi et al., 2025). Beyond economics, asymmetric information affects patient autonomy, shared decision-making, and safety through communication failures and differential access to reliable health information (Huang et al., 2025; Ma et al., 2025).

Despite considerable theoretical attention, empirical evidence remains scattered across settings and methodologies. A consolidated synthesis is necessary to inform policy design and prioritize research. This review addresses -What are the documented impacts of information asymmetry in healthcare across cost, quality, insurance markets, patient-cantered outcomes, and safety? Additionally, to find out that what strategies have been empirical or modelled evidence for mitigating these impacts?

2. RESEARCH METHODOLOGY

2.1 Design and reporting

This Systematic Literature Review followed the PRISMA 2020 reporting standards (https://estech.shinyapps.io/prisma_flowdiagram/). The protocol was not registered prior to analysis because the review was constructed from two pre-supplied datasets; nevertheless, the selection, screening, and extraction methods were predefined and applied consistently.

2.2 Data sources and dataset merging

Two electronic datasets provided by the investigator were used:

1. Scopus data base
2. PubMed records

Datasets were merged, deduplicated by DOI and title, producing a combined corpus of 92 unique records.

2.3 Eligibility criteria

Studies were eligible if they:

- Examined or theorized aspects of information asymmetry in healthcare (including constructs such as asymmetric information, moral hazard, adverse selection, supplier-induced demand, transparency deficits, health literacy gaps, or shared decision-making barriers).
- Reported empirical findings or theoretical models with explicit healthcare relevance.
- Were published in English during the period 2010-25

Studies with no conceptual link to information asymmetry, non-healthcare topics, and abstracts or comments without substantive analysis, were excluded.

2.4 Study selection

We applied a two-stage screening:

- Stage 1: Title/abstract screening for keyword presence (e.g., “information asymmetry,” “moral hazard,” “adverse selection,” “supplier-induced demand,” “transparency,” “health literacy,” “shared decision-making”).
- Stage 2: Full-text assessment for conceptual relevance and outcomes alignment.

From 92 screened records, 27 studies were included after full-text review.

2.5 Data extraction and quality assessment

For each included study we extracted authors, year, setting, study design, the specific asymmetry construct examined, outcomes, and key findings. Given heterogeneous designs and the objective to synthesize diverse methodologies, risk-of-bias assessment used design-appropriate considerations (e.g., sample selection, confounding for quantitative studies; credibility and reflexivity for qualitative studies). Because the dataset comprised varied study types, we did not compute pooled effect sizes; instead, a narrative synthesis was performed.

2.6 Synthesis approach

Findings were categorized into thematic domains: cost and utilization effects, insurance market effects (moral hazard/adverse selection), quality and provider behavior, patient autonomy and decision-making, and safety/public health outcomes. Cross-cutting mitigation strategies and research gaps were identified and summarized.

3. RESULTS

3.1 PRISMA flow summary

From an initial combined set of 100 records (Scopus-70+PubMed-30) were identified, removed duplicates and unique records, 92 abstracts were screened. After title/abstract screening, 44 full-text articles were retrieved and assessed for eligibility; 27 studies were included in the final synthesis as shown in figure1. Reasons for exclusion at full text included lack of conceptual analysis of asymmetry and weak methodology / insufficient data.

Figure No.1- Result of PRISMA analysis for Systematic Literature Review

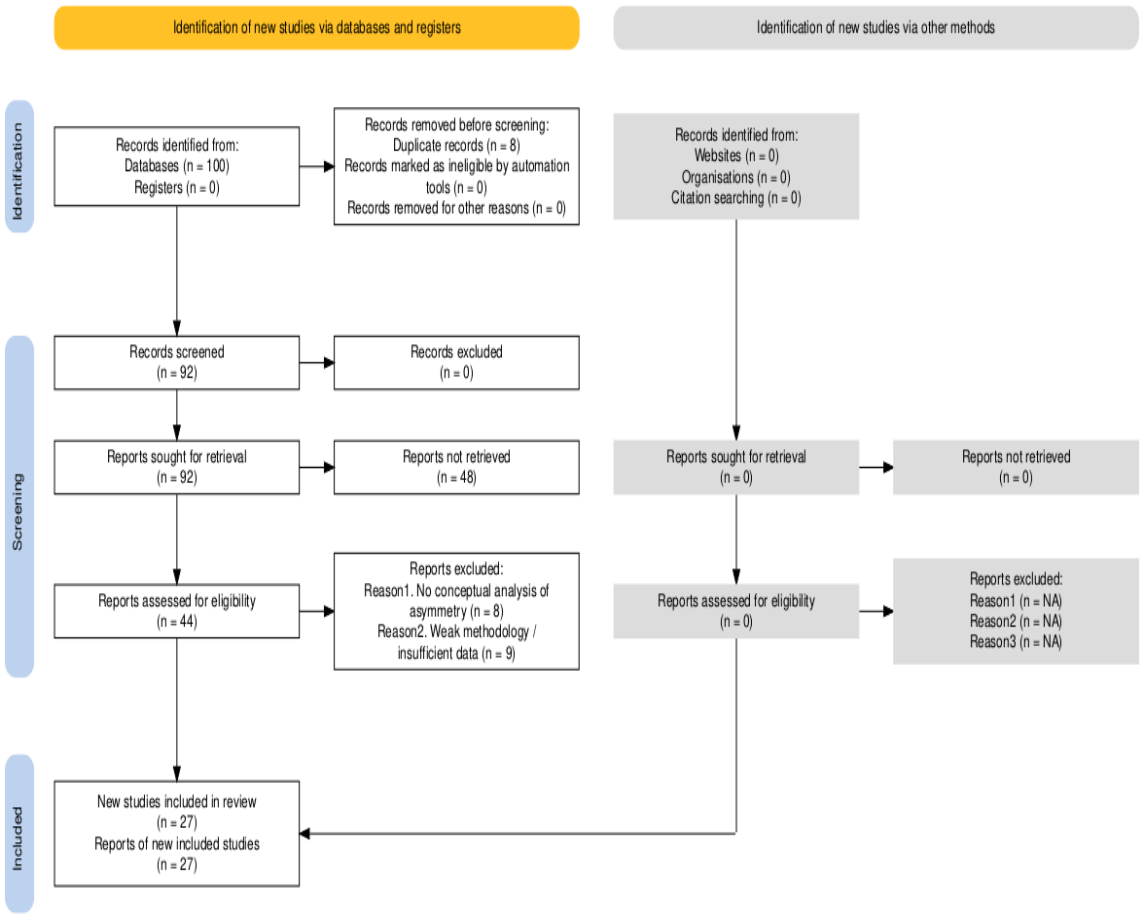

Figure No.1- Result of PRISMA analysis for Systematic Literature Review

3.2 Study characteristics

The included literature comprised:

- Quantitative empirical analyses and natural experiments (e.g., Hall et al., 2025; Yue et al., 2025),
- Theoretical and modelling studies exploring incentive structures (e.g., Bi et al., 2025),
- Qualitative and mixed-methods work examining patient information needs and clinician–patient communication (e.g., Cabanes et al., 2025; Huang et al., 2025),
- Reviews and narrative syntheses linking asymmetry to broader system outcomes (e.g., Ma et al., 2025).

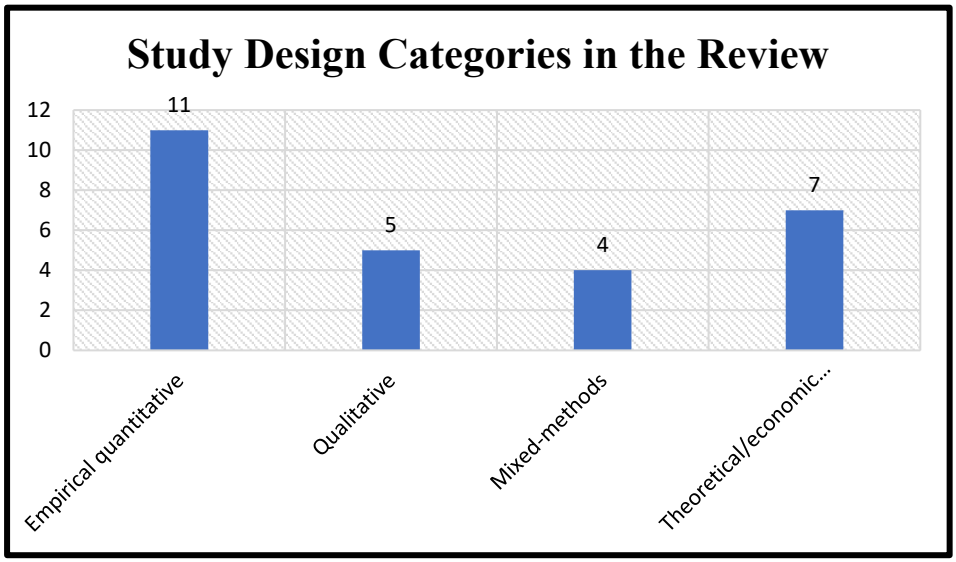

Figure No.2 Different designs of studies included in the review

Figure 2 illustrates the various study designs represent in the systematic review, highlighting the methodological diversity across the included research articles, such as qualitative studies, quantitative analyses, mixed-methods designs, and conceptual or theoretical papers.

Figure 3 shows the geographic distribution of selected studies conducted in different economic zone as high-income countries (e.g., Europe, North America), middle-income environments (e.g., China, parts of Africa), and lower-income contexts (e.g., Ghana; Agula et al., 2025; Madzorera et al., 2025).

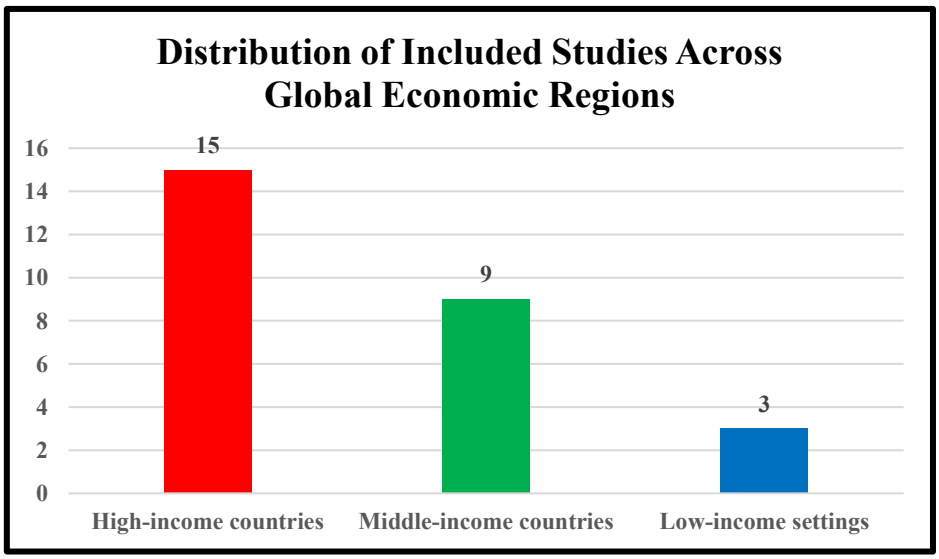

Figure No.3 Distribution Studies Across Economic Regions

3.3 Thematic findings

3.3.1 Cost and utilization: supplier-induced demand and resource overuse

Multiple empirical studies indicated that informational asymmetries are also affected by supplier-induced demand as sometimes providers recommending additional services which cannot be evaluated by the patients to understand the necessity. This results into increased healthcare expenditure and sometimes undesired procedures (Hall et al., 2025; Yue et al., 2025). These studies used administrative claims and field experiments to demonstrate that most of the times patients do not know the true price of the services or consumables. It is also observed that many times suggestions given by the HealthCare providers do not realize into the much health benefits/results. (Hall et al., 2025).

3.3.2 Insurance markets: adverse selection and moral hazard

Asymmetric information between insurers and potential beneficiary, produces adverse selection when individuals with greater health risk are likelier to seek coverage, and moral hazard when insurance coverage increases the consumption of services because patients bear less marginal cost (Bi et al., 2025; Hall et al., 2025). Several modelling and empirical contributions illustrate how premium adjustments and underwriting practices respond to information asymmetries and benefit the insurers often with trade-offs (Bi et al., 2025).

3.3.3 Quality of care and provider behaviour

Quality in healthcare is very much essential as its right of the patient but there is not clarity on various measures of the quality. Patients are not competent enough to decide the high-quality care providers which sometimes lead to undesirable adverse impact on the health. This situation not only compromises with the quality outcome even also contribute in increasing healthcare expenditures (Shih et al., 2025; Xu et al., 2025). Studies also highlight that complex technical knowledge of clinical decision making possessed by the healthcare providers make them working for their own interests. Many times, this autonomy results into compromising with the patient's care and other healthcare benefits (Shih et al., 2025).

3.3.4 Patient autonomy, shared decision-making, and health literacy

Qualitative and mixed-methods studies highlight that inadequate healthcare information of the patients, insufficient healthcare literacy and less involvement in clinical decision, aggravate the problem of information asymmetry. Ethos of patient's centred care are compromised due to insufficient patient participation in clinical healthcare decision making (Cabanes et al., 2025; Huang et al., 2025). The studies suggest that various decision aids and co-designed informational interventions were proposed and trialed in select contexts with satisfactory but context-dependent results (Cabanes et al., 2025).

3.3.5 Safety and public health outcomes

Underreporting of adverse events, poor communication about risks, and uneven use of preventive measures are also responsible for information asymmetry which sometimes cause patient safety related issue. Research shows due to lack of trustworthy communication by the providers to the patients even potentiate the public health crisis as initial vaccine hesitancy during COVID pandemic. (Madzorera et al., 2025; Ma et al., 2025).

3.4 Evidence on mitigation strategies

Several included studies evaluated or modelled interventions proposed to reduce information asymmetry:

- **Transparency and public reporting**: Performance dashboards and outcome of the healthcare providers, reporting can reduce the information gaps with appropriate standardization and risk adjustment (Yue et al., 2025).
- **Decision aids and co-designed patient education**: Improve shared decision-making can also help in lowering the likelihood of overtreatment when properly implemented (Cabanes et al., 2025).

- **Digital health records and radiology image sharing**: help in better information flow between providers and patients, enhancing access and potentially reducing redundant testing and procedures (Huang et al., 2025).
- **Regulatory incentives and payment reforms:** Value-based purchasing and enforcing guidelines can mitigate the problems generated due to information asymmetry, by encouraging providers to act on accurate, shared information. But these approaches are not easy to implement over the night as some times they can create new, unintended incentives. (Bi et al., 2025; Shih et al., 2025).

Overall, empirical evaluations of mitigation efforts are promising but limited by context heterogeneity and short follow-up intervals.

4. DISCUSSION

4.1 Main findings

Overall, the evidence highlights that information asymmetry is a long-standing problem in healthcare that leads to inefficiency, unfairness, and safety issues. Studies consistently highlight that information disparity between the providers and beneficiaries can lead to unnecessary treatments, problems in insurance markets, less patient involvement in decisions, and preventable harm caused by poor communication. (Hall et al., 2025; Bi et al., 2025; Cabanes et al., 2025; Ma et al., 2025).

4.2 Policy implications

Several interventions are required to reduce the information asymmetry issues at different levels:

- **Supply-side transparency**: Standardized outcome and process reporting, publicly available performance metrics, and accreditation can reduce information gaps (Yue et al., 2025).
- **Demand-side empowerment**: Health literacy programs, tailored decision aids, and co-designed patient education can strengthen patient agency (Cabanes et al., 2025).
- **Payment and regulatory reforms**: Payment models that reward value over volume and regulatory oversight of provider behavior can reduce perverse incentives that exploit informational gaps (Bi et al., 2025; Shih et al., 2025).
- **Digital infrastructure**: Interoperable health records and image-sharing platforms enhance transparency across providers and patients, potentially reducing redundant healthcare services (Huang et al., 2025).

Policymakers must ensure the balance as patient may get confused if too much information given to the patients without proper explanation. Disclosure of hospital or doctors' performances can distort the incentives if proper case-mix adjustment not carried out about the illness.

4.3 Limitations of the study

This review has several strengths: it used a systematic, keyword-based screening method, combined two standard datasets, and considered different research approaches. However, it also has limitations. Findings are based on a limited set of studies and some relevant research may have been missed. The studies varied in quality due to different perspectives of information asymmetry, and suggested mitigation strategies may work only in the short term. Because the studies were so different from one another, a meta-analysis wasn't possible leading to a qualitative summary instead.

4.4 Future research

Key research priorities include:

- Controlled, long-term evaluations are needed to assess effectiveness of interventions in reduction of information asymmetry rather than producing short-lived effects. Controlled study designs identify isolate intervention impacts, while long-term and cross-system analyses reveal sustainability, unintended consequences, and contextual differences across diverse healthcare settings.

- Comparative studies exploring how health system structure mediates asymmetry impacts.
- Role of AI (Artificial Intelligence) in addressing the information asymmetry in healthcare

5. CONCLUSION

Information asymmetry is a core structural challenge in healthcare systems, affecting costs, quality, insurance stability, patient agency, and safety. Addressing asymmetry requires integrated policies: transparency with methodological rigor, patient empowerment through literacy and decision support, regulatory and payment realignment, and investment in health information systems. Future work should adopt rigorous comparative and longitudinal designs to evaluate the real-world impact of mitigation strategies.

Ethical declaration: As this study is Systematic Literature Research Review, no ethical approval was required. However, the analysis was guided by principles of data integrity, reproducibility, and transparency

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