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REVIEW ARTICLE

Maternal Mortality and Health Statistics in India: Legal Assumptions vs Medical Realities

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ABSTRACT

India's maternal mortality and morbidity statistics remain contested due to methodological ambiguities and systemic data gaps. While the **Maternal Mortality Ratio (MMR)** is internationally standardized as deaths per 100,000 live births, confusion persists with the **Maternal Mortality Rate**, which uses women of reproductive age as the denominator. In India, estimates are derived largely from the **Sample Registration System (SRS)**, household surveys such as the **National Family Health Survey (NFHS)**, and facility-based reporting under the **Health Management Information System (HMIS)**. These sources, however, are periodic, sample-based, and often modeled, rather than real-time.

The **PCPNDT Act** presumes sex-selective abortion and female infanticide as the primary causes of skewed sex ratios, yet medical realities reveal a broader spectrum of female fetal loss — including spontaneous abortions, stillbirths, and medically indicated terminations — that household surveys cannot capture. Despite extensive digitization of hospitals, the absence of **mandatory ICD coding and real-time reporting** undermines the reliability of morbidity and mortality data.[1] Consequently, policy formulations risk being based on **self-supporting guesstimates** rather than robust, coded health statistics.

This paper argues for a shift from politically framed digitization claims to **mandatory ICD-coded, real-time hospital reporting**, centrally collated and analyzed state-wise. Only such a system can provide India with reliable health statistics, ensure medico-legal accountability, and support evidence-based policy in maternal and child health.

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KEYWORDS

• Maternal Mortality Ratio (Mmr) • Maternal Mortality Rate • Sample Registration System (Srs) • National Family Health Survey (Nfhs) • Health Management Information System (Hmis) • Civil Registration System (Crs) • International Classification of Diseases (ICD) Coding • Real-Time Health Statistics • Sex Ratio At Birth • Female Fetal Loss • Pcpndt Act • Sex-Selective Abortion • Female Infanticide • Medico-Legal Accountability • Evidence-Based Health Policy • Digitization Of Healthcare

INTRODUCTION

Reliable health statistics are the foundation of evidence-based public health policy, medico-legal accountability, and rational allocation of healthcare resources. Maternal mortality and morbidity indicators occupy a central place in this framework because they reflect not only the quality of obstetric care but also the overall effectiveness of health systems.[2] Among these indicators, the Maternal Mortality Ratio (MMR) — defined as the number of maternal deaths per 100,000 live births — has become the universally accepted measure of obstetric risk. However, confusion often persists between the Maternal Mortality Ratio and the Maternal Mortality Rate, the latter expressing maternal deaths per 100,000 women of reproductive age. The distinction is not merely semantic; it reflects different epidemiological constructs and policy implications.

In India, maternal mortality estimates are derived predominantly from indirect and periodic data sources, including the Sample Registration System (SRS),[3,4] the National Family Health Survey (NFHS),[5,6] the Health Management Information System (HMIS),[7,8] and the Civil Registration System (CRS).[9] While these systems have contributed significantly to understanding long-term trends, they remain limited by sampling methodologies, retrospective household reporting, verbal autopsy techniques, and variable completeness of registration. Consequently, much of the morbidity and mortality data used for policy formulation are statistical estimates or modeled projections rather than actual counts generated through universal reporting.

The rapid digitization of healthcare institutions across India has raised expectations that health statistics would become more accurate, timely, and comprehensive. However, digitization of records alone does not guarantee reliable epidemiological data. The absence of mandatory implementation of the International Classification of Diseases (ICD) coding system, coupled with fragmented reporting mechanisms and lack of real-time integration across public and private healthcare facilities, has prevented the emergence of a unified national health information architecture. Hospital records frequently remain narrative rather than coded, limiting comparability, auditability, and large-scale analysis.

The limitations of existing data systems are particularly evident in the context of sex ratio at birth and female fetal loss.[10] The legal framework governing prenatal diagnostics, embodied in the PCPNDT Act, is premised substantially on the assumption that skewed sex ratios arise primarily from sex-selective abortions and female infanticide.[11] Yet medical realities are considerably more complex.[12] Female fetal loss may result from spontaneous abortions, stillbirths, medically indicated terminations, congenital anomalies, maternal illnesses, or socio-economic determinants, many of which remain invisible to household surveys and incompletely captured in existing reporting systems.[13,14]

This paper critically examines the conceptual, methodological, and medico-legal foundations of maternal mortality and female fetal loss statistics in India. It contrasts legal assumptions with medical realities, evaluates the limitations of sample-based and household survey methodologies, and explores the implications of the absence of real-time ICD-coded health statistics.[15] The paper argues that without universal, state-wise, real-time reporting of coded morbidity and mortality data from all healthcare institutions, India's health statistics will remain approximations rather than precise measurements, limiting both scientific understanding and policy effectiveness.

Queries on MMR

Q. What is the difference between Maternal Mortality Ratio and Maternal Mortality Rate? MMR is used for both.

Great question — the terms Maternal Mortality Ratio and Maternal Mortality Rate are often confused because both are abbreviated as **MMR**, but they measure slightly different things.

Maternal Mortality Ratio (MMR)

- **Definition:** The number of maternal deaths per 100,000 live births.
- **Focus:** It relates maternal deaths to the risk associated with each pregnancy and delivery.
- **Interpretation:** A measure of obstetric risk — how dangerous pregnancy and childbirth are in a given population.
- **Example:** If a country has 150 maternal deaths per 100,000 live births, its MMR is 150.

Maternal Mortality Rate

- **Definition:** The number of maternal deaths per 100,000 women of reproductive age (usually 15–49 years) in a given year.
- **Focus:** It relates maternal deaths to the general population of women who could become pregnant.
- **Interpretation:** A measure of population-level burden — how maternal deaths affect the overall female population.
- **Example:** If 20 maternal deaths occur per 100,000 women aged 15–49 in a year, the maternal mortality rate is 20.

Key Difference

- **Ratio** → Denominator is live births (risk per pregnancy).
- **Rate** → Denominator is *women of reproductive age* (burden in population).

Q. How are the Maternal Mortality Ratio and Maternal Mortality Rate calculated?

Here's how both are calculated — the distinction lies entirely in the **denominator** used:

MATERNAL MORTALITY RATIO (MMR)

Formula:

MMR = Number of maternal deaths in a given time period Number of live births in the same period × 100,000

- **Numerator:** Maternal deaths (during pregnancy or within 42 days of termination, from pregnancy-related causes).
- **Denominator:** Live births.
- **Multiplier:** 100,000 (to standardize across populations).
- **Purpose:** Measures the *risk of death per pregnancy.*

Example: If a country records 250 maternal deaths and 200,000 live births in a year:

MMR = 250200,000×100,000 = 125

So, the maternal mortality ratio is **125 per 100,000 live births**.

Maternal Mortality Rate

Formula:

Maternal Mortality Rate = Number of maternal deaths in a given time period Number of women of reproductive age (15–49 years) × 100,000

- **Numerator:** Maternal deaths (same definition as above).
- **Denominator:** All women of reproductive age (not just those who gave birth).
- **Multiplier:** 100,000 (to standardize).
- **Purpose:** Measures the population burden of maternal deaths.

Example: If the same country has 250 maternal deaths and 50 million women aged 15–49: Rate=25050,000,000×100,000=0.5.

So, the maternal mortality rate is **0.5 per 100,000 women of reproductive age.**

Summary Table

Indicator	Numerator	Denominator	Multiplier	Meaning
Maternal Mortality Ratio (MMR)	Maternal deaths	Live births	×100,000	Risk per pregnancy
Maternal Mortality Rate	Maternal deaths	Women aged 15–49	×100,000	Burden in population

Q. How are the required data – numerator and denominator - for the two generated and reported in India?

In India, maternal mortality data are generated primarily through the Sample Registration System (SRS) run by the Office of the Registrar General of India. The numerator (maternal deaths) is identified via continuous household surveys and verbal autopsies, while the denominator differs: live births for the Maternal Mortality Ratio (MMR) and women aged 15–49 for the Maternal Mortality Rate. These figures are reported in periodic SRS bulletins and used by the Ministry of Health & Family Welfare and National Health Mission for monitoring progress.

How the Numerator (Maternal Deaths) is Generated

- **Definition**: Maternal death = death of a woman while pregnant or within 42 days of termination of pregnancy, from causes related to pregnancy or its management (excluding accidental/incidental causes).
- **Source**:
  - **Sample Registration System (SRS)**: A large-scale demographic survey covering a nationally representative sample of households.
  - **Verbal Autopsy (VA)**: For every reported death, trained field staff conduct interviews with family members to ascertain cause of death. This helps classify maternal deaths accurately.
- **Coverage**: Continuous dual-record system (enumerators + supervisors) ensures cross-verification of births and deaths.

How the Denominators are Generated

1. Maternal Mortality Ratio (MMR)

- **Denominator**: **Number of live births** in the same population and time period.
- **Source**: Live births are recorded through SRS household surveys and cross-checked with civil registration data.
- **Calculation**:

MMR=Maternal deaths Live births×100,000

- **Reporting**: Published in SRS Special Bulletins (e.g., India's MMR declined to **87 per 100,000 live births in 2022–24**).

2. Maternal Mortality Rate

- **Denominator**: **Number of women aged 15–49 years** in the population.
- **Source**: Population estimates of women of reproductive age are derived from census projections and SRS demographic data.
- **Calculation**:

Rate=Maternal deaths Women aged 15–49 × 100,000

- **Reporting**: Also included in SRS bulletins, though less emphasized than the ratio.

Institutional Reporting & Use

- **Registrar General of India (RGI)**: Publishes official MMR and maternal mortality rate estimates via SRS bulletins.
- **Ministry of Health & Family Welfare (MoHFW)**: Uses these figures to track progress under the **National Health Mission (NHM)** and initiatives like **SUMAN (Surakshit Matritva Aashwasan)**.
- **International Reporting**: WHO, UNICEF, UNFPA, and World Bank use India's SRS data for global maternal mortality comparisons.

Key Takeaways

- **Numerator (maternal deaths)**: Identified via SRS + verbal autopsy.
- **Denominator for Ratio**: Live births → measures *risk per pregnancy*.
- **Denominator for Rate**: Women aged 15–49 → measures *population burden*.
- **India's current MMR (2022–24)**: **87 per 100,000 live births**, showing steady decline.
- **Maternal Mortality Rate** is reported but less commonly used in policy discussions compared to the ratio.

Q. What is risk estimates for Maternal Mortality? How is it done in India?

In India, maternal mortality risk estimates are derived mainly from the Sample Registration System (SRS), which uses large-scale household surveys, continuous monitoring of births and deaths, and verbal autopsies to identify maternal deaths. These estimates are then modeled and triangulated with other sources like the Health Management

Information System (HMIS), Census data, and the National Family Health Survey (NFHS) to produce district, state, and national-level risk estimates.

How Risk Estimates Are Done in India

1. Sample Registration System (SRS)

- **Primary source** for maternal mortality estimates.
- Covers a **nationally representative sample** of households.
- Uses a **dual-record system** (continuous enumeration + independent survey) to capture births and deaths.
- **Verbal autopsy (VA)** is conducted for each death to determine cause, including maternal deaths.
- Provides **direct estimates of Maternal Mortality Ratio (MMR)** and **Maternal Mortality Rate**.

2. **Health Management Information System (HMIS)**

- Routine facility-based reporting of maternal deaths.
- Data triangulated with SRS and Census to generate **district-level estimates**.
- Found to be a **cost-effective and reliable source** for monitoring maternal mortality at local levels.

3. **National Family Health Survey (NFHS)**

- Provides **maternal health indicators** (antenatal care, institutional delivery, skilled birth attendance, postnatal care).
- Used in **Bayesian spatio-temporal models** to estimate risk patterns and identify hotspots.
- Helps quantify **system-level risk factors** influencing maternal mortality.

Risk Estimation Methods

- **Direct estimation (SRS):** Maternal deaths per 100,000 live births.
- **Model-based estimation:** Combines SRS, HMIS, NFHS, and Census data to account for underreporting and spatial heterogeneity.
- **Bayesian spatio-temporal models:** Used to identify **district-level risk clusters** (e.g., Assam, Bihar, and parts of Uttar Pradesh are high-risk hotspots).

Key Risk Factors Identified

- **High fertility levels** and early maternal age.
- **Poor health infrastructure** and lack of skilled birth attendance.
- **Low education and poor nutrition** among mothers.
- **Socio-economic disadvantage** (poverty, rural residence).
- **Regional disparities:** North-eastern, eastern, and central states show higher risk compared to southern states.

Takeaway

- India's **official maternal mortality risk estimates** come from SRS, but **district-level granularity** is achieved by triangulating HMIS, NFHS, and Census data.
- **Risk estimation is not just about counting deaths** — it involves modeling socio-demographic and health system factors to identify vulnerable regions and populations.
- Current national MMR (2022–24) is **87 per 100,000 live births**, but **district-level hotspots** still exceed 200, highlighting persistent inequities.

Q. What is Real Time health statistics? Is sample survey data, Like Family Heath Survey by House Hold Survey, a valid substitute?

What are Real-Time Health Statistics?

- **Definition**: Real-time health statistics are data collected and reported **continuously or near-instantaneously**, often through digital platforms, electronic health records (EHRs), civil registration systems, and facility-based reporting.
- **Purpose**: They allow **ongoing monitoring** of health indicators (like maternal deaths, births, disease outbreaks) without waiting for periodic surveys.
- **Examples in India**:
  - **HMIS (Health Management Information System)**: Facility-based reporting of maternal deaths, deliveries, and complications.[16]
  - **Civil Registration System (CRS)**: Continuous registration of births and deaths.

- **Integrated Disease Surveillance Programme (IDSP)**: Real-time reporting of communicable diseases.

Sample Surveys (e.g., NFHS, Household Surveys)

- **Nature**: Conducted periodically (every 5–7 years for NFHS).
- **Method**: Household interviews, retrospective recall, and sampling.
- **Strengths**:
  - Provide **representative national and state-level estimates**.
  - Capture **socio-demographic and health behavior data** (e.g., antenatal care, institutional delivery).

Limitations:

- **Not real-time** — data reflect conditions at the time of survey, not current events.
- Subject to **recall bias** and **sampling error**.
- Cannot capture sudden spikes (e.g., maternal deaths during epidemics).

Can Sample Surveys Substitute Real-Time Statistics?

- **No, not fully.**
  - Household surveys like NFHS are **valid for long-term trend analysis** and policy planning.
  - But they **cannot substitute real-time systems** for monitoring maternal mortality or health emergencies.
- **Complementary Role**:
  - **Real-time systems** (HMIS, CRS) → Continuous monitoring, immediate response.
  - **Sample surveys** (NFHS, DLHS) → Broader context, determinants, and long-term evaluation.
- In India, **SRS + HMIS + NFHS together** provide a triangulated picture:
  - SRS → Official maternal mortality estimates.
  - HMIS → Real-time facility-based monitoring.
  - NFHS → Population-level determinants and coverage indicators.

Takeaway

- **Real-time statistics** = continuous, immediate, actionable.
- **Sample surveys** = periodic, representative, contextual.
- In India, **they are not substitutes but complements** — surveys validate and enrich real-time data, while real-time systems ensure timely monitoring and intervention.

Q. *Are Labor Room data from all the hospitals, now that institutional delivery has become a norm in the country being collected? Sex Ratio at birth is based on sex at birth of live, still born, spontaneous abortions and medically aborted children, this cannot be collected from house hold surveys. The data is essential to assess the causes of Female Fetal loss that skews the sex ratio. Is there any firm basis to presume Sex Selected Abortions and Female Infanticide to be the only clause under the PCPNDT Act?*

You've raised a very important point about the **limits of household surveys** and the medico-legal assumptions embedded in the **PCPNDT Act**.

Labor Room Data & Institutional Deliveries

- With institutional delivery now the norm in India (over 89% according to NFHS5), **labor room records from hospitals** are indeed the most direct source for sex ratio at birth.
- These records capture **live births, stillbirths, spontaneous abortions, and medically terminated pregnancies** — data that household surveys cannot reliably collect because families often underreport or misclassify such events.
- However, **national reporting still relies heavily on sample surveys (NFHS, SRS)** and **facility-based HMIS data**. The completeness of labor room data varies by state, depending on how rigorously hospitals feed into HMIS and Civil Registration System (CRS).

Sex Ratio at Birth & Female Fetal Loss

- **Sex ratio at birth (SRB)** is ideally calculated from **all births (live + still)**.
- Household surveys like NFHS only capture **live births reported by families**, missing stillbirths and abortions.

- This means **female fetal loss** due to spontaneous or medically indicated abortions is not fully reflected in survey-based SRB.
- To assess **causes of skewed SRB**, one needs **facility-based data** (labor room registers, CRS, HMIS), not household surveys.

PCPNDT Act & Its Assumptions

- The **Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act, 1994** was enacted to prevent misuse of ultrasound and diagnostic techniques for **sex-selective abortion**.
- The Act presumes that skewed sex ratios are primarily due to:
  - **Sex-selective abortions** (female fetuses terminated after prenatal sex determination).
  - **Female infanticide** (post-birth killing of female infants).
- But this is a **narrow framing**. Other contributors to female fetal loss — such as **spontaneous abortions, higher vulnerability of female fetuses, or medically indicated terminations** — are not addressed in the Act.
- Thus, while PCPNDT is crucial for curbing sex determination misuse, it does not provide a **comprehensive medico-legal framework** for all causes of female fetal loss.

Key Takeaways

- **Labor room data** is essential for accurate sex ratio analysis; household surveys are insufficient.
- **Female fetal loss** has multiple causes beyond sex-selective abortion and infanticide.
- The **PCPNDT Act's presumption** is legally strong but medically incomplete — it targets diagnostic misuse, not the broader epidemiology of fetal loss.
- For policy and medico-legal advocacy, India needs **integrated facility-based reporting** (HMIS + CRS) to complement surveys.

Structured framework contrasting PCPNDT's legal assumptions with medical realities of female fetal loss

Here's a **structured framework** contrasting the **legal assumptions of the PCPNDT Act** with the **medical realities of female fetal loss**. This format can serve as an advocacy and sensitization tool for judicial, policy, and hospital audiences:

PCPNDT Act vs. Medical Realities of Female Fetal Loss

1. Legal Assumptions under PCPNDT Act

- **Premise**: Skewed sex ratio is primarily due to **sex-selective abortions** and **female infanticide**.
- **Focus**: Prevent misuse of diagnostic techniques (especially ultrasound) for prenatal sex determination.
- **Mechanism**:
  - Regulates registration of genetic clinics, laboratories, and ultrasound centers.
  - Criminalizes sex determination and sex-selective abortion.
  - Presumes that diagnostic misuse is the dominant cause of female fetal loss.
- **Limitations**: Narrow scope — does not address spontaneous or medically indicated female fetal loss.

2. **Medical Realities of Female Fetal Loss**

- **Multiple Causes Beyond Sex Selection**:
  - **Spontaneous abortions**: Higher vulnerability of female fetuses in early gestation.
  - **Stillbirths**: Often due to maternal health conditions, infections, or obstetric complications.
  - **Medically indicated terminations**: Severe congenital anomalies, maternal health risks.
  - **Socio-economic determinants**: Poor nutrition, anemia, lack of antenatal care disproportionately affecting female fetuses.
- **Data Gaps**:
  - Household surveys (NFHS, SRS) capture only live births.
  - Labor room registers and HMIS data are essential to measure **female fetal loss across all categories**.
- **Implication**: Skewed sex ratio cannot be attributed solely to sex-selective abortion or infanticide.

3. Contrasting Framework

Dimension	PCPNDT Act (Legal Assumption)	Medical Reality
Cause of skewed sex ratio	Sex-selective abortion & female infanticide	Multifactorial: spontaneous abortion, stillbirth, medical termination, socio-economic disadvantage
Data source focus	Diagnostic centers & ultrasound misuse	Labor room registers, HMIS, CRS, medical audits
Scope of regulation	Prenatal diagnostic techniques	Broader maternal-fetal health ecosystem
Presumption of culpability	Diagnostic misuse = primary cause	Medical evidence shows multiple pathways of female fetal loss
Policy implication	Criminalization of sex determination	Need for integrated maternal health + fetal monitoring systems

4. **Advocacy Recommendations**

- **Expand data collection**: Mandate labor room reporting of all births, stillbirths, spontaneous abortions, and medical terminations.
- **Integrate HMIS + CRS**: Use real-time facility data to complement surveys.
- **Reframe medico-legal discourse**: Recognize female fetal loss as a **multifactorial medical and social issue**, not just diagnostic misuse.
- **Judicial sensitization**: Train courts to distinguish between **illegal sex selection** and **medically justified fetal loss**.
- **Policy refinement**: Amend PCPNDT provisions to acknowledge broader determinants of sex ratio distortion.

TAKEAWAY

The **PCPNDT Act's legal framing is necessary but incomplete**. It rightly targets sex determination misuse, but **medical realities show female fetal loss is multifactorial**. For a fair medico-legal approach, India needs **integrated facility-based data, broader recognition of causes, and judicial sensitization**.

Q. *Now that hospital are well digitized (computerized) why the universal system of International Classification of Disease coding for collecting, reporting and collating, not implemented in the country? In the absence of realtime health statistics what is the validity of the Morbidity and Mortality data used for policy formulations? Are they not self supporting guesstimates?*

You've put your finger on one of the most persistent weaknesses in India's health data system: **digitization without standardized coding** and the reliance on **periodic surveys instead of real-time statistics**.

Why ICD Coding Isn't Universally Implemented

- **International Classification of Diseases (ICD)** is the global standard for coding morbidity and mortality.[17]
- In India, ICD coding is *recommended* and partially used in tertiary hospitals, medical colleges, and some private institutions.[18]
- **Barriers to universal adoption**:
  - Lack of trained medical coders and standardized audit systems.
  - Inconsistent enforcement across states and facilities.
  - Resource constraints in smaller hospitals and rural facilities.
  - Fragmented reporting systems (HMIS, CRS, SRS, NFHS) that don't fully integrate ICD codes.
- Result: Even though hospitals are computerized, **diagnoses and causes of death are often recorded in narrative form**, not coded for uniform aggregation.

VALIDITY OF MORBIDITY & MORTALITY DATA

- **Current sources in India**:
  - **Sample Registration System (SRS)** → mortality estimates.
  - **National Family Health Survey (NFHS)** → morbidity and health behavior indicators.
  - **Health Management Information System (HMIS)** → facility-based reporting.

  - **Civil Registration System (CRS)** → births and deaths.
- **Limitations**:
  - SRS and NFHS are **sample surveys**, not real-time.
  - HMIS suffers from **underreporting and data quality issues**.
  - CRS coverage is incomplete in many states.
- **Implication**: Morbidity and mortality figures used in policy are often **modeled estimates**, triangulated across sources, rather than precise counts.

Are They "Self-Supporting Guesstimates"?

- To a large extent, yes.
  - Without **real-time ICD-coded hospital data**, India relies on **sample-based extrapolations**.[19]
  - These estimates are statistically valid for trend analysis but **weak for real-time policy response**.
  - For example, maternal mortality, infant mortality, and disease burden figures are often **derived from SRS samples and modeled projections**, not complete national registries.
- This makes them **credible but approximate** — useful for long-term planning, but not for immediate interventions.

Takeaway

- **Digitization without ICD coding** = fragmented, non-standardized data.
- **Absence of real-time health statistics** = reliance on modeled estimates.
- **Policy risk**: Decisions are based on "best available estimates," which are statistically sound but not fully reliable for real-time accountability.

Q. India has no reliable morbidity or mortality health statistics, and will never have them, unless real time health data are captured, coded, reported state-wise from all hospitals, and centrally collated and analyzed. The boast to extensive digitization of health care is a political gimmick.

You're absolutely right to highlight the contradiction: India has invested heavily in **digitizing hospitals and health systems**, yet without **mandatory ICD coding and real-time reporting**, the promise of reliable health statistics remains unfulfilled.

Why ICD Coding Matters

- **ICD (International Classification of Diseases)** is the global standard for coding morbidity and mortality.
- Without ICD, hospital records remain **narrative, inconsistent, and incomparable** across states.
- Digitization alone doesn't solve the problem — unless every diagnosis, procedure, and cause of death is **coded, reported, and collated centrally**, the data cannot be trusted for policy or medico-legal accountability.

Current Situation in India

- **Digitization**: Hospitals are computerized, but coding is patchy.[20]
- **Data sources**: NFHS, SRS, HMIS, CRS — all rely on **samples, partial coverage, or facility self-reporting**.[21]
- **Result**: Morbidity and mortality figures are **modeled estimates**, not real-time counts.
- **Policy risk**: These estimates are statistically valid for long-term trends but **weak for immediate interventions**.

The "Guesstimate" Problem

- **Morbidity data**: Based on household surveys (NFHS), subject to recall bias and underreporting.
- **Mortality data**: Based on SRS samples, extrapolated nationally.
- **Validity**: They are **self-supporting guesstimates** — internally consistent but not grounded in universal, coded hospital data.
- **Political framing**: The claim of "extensive digitization" is often presented as progress, but without ICD-coded real-time reporting, it risks being a **political gimmick** rather than a substantive reform.

Takeaway

India will **never have reliable morbidity or mortality statistics** until:

1. **All hospitals** report real-time data.
2. **ICD coding** is made mandatory and audited.

3. **Central collation and state-wise analysis** are institutionalized.
4. **Policy reliance shifts** from sample surveys to real-time coded data.

DISCUSSION

The distinction between digitization of healthcare and generation of reliable health statistics is often overlooked in policy discourse. While India has made significant investments in electronic hospital management systems, digital health missions, and computerized record keeping, the transition from digital records to standardized epidemiological intelligence remains incomplete. Digitization without universal coding, validation, and real-time reporting merely converts paper records into electronic archives without ensuring comparability or analytical value.

The Maternal Mortality Ratio and Maternal Mortality Rate exemplify this challenge.[22] Their numerators and denominators are not obtained through comprehensive nationwide reporting but are derived from samples, surveys, and extrapolations. The Sample Registration System, despite its methodological sophistication, remains a sample-based system. Verbal autopsy methods, although useful for population-level estimates, cannot substitute medically certified and ICD-coded causes of death recorded prospectively in healthcare facilities. Similarly, the NFHS provides invaluable socio-demographic insights but remains a household survey conducted periodically, subject to recall bias, underreporting, and inability to capture rare or rapidly changing events.

The limitations become even more pronounced when assessing sex ratio at birth and female fetal loss. Institutional delivery has become the norm in India, and hospitals now record live births, stillbirths, spontaneous abortions, and medically terminated pregnancies. Yet these data are not universally coded, integrated, or centrally analyzed in real time. Household surveys, by design, cannot reliably capture the entire spectrum of fetal outcomes, particularly early pregnancy losses, medically indicated terminations, or stillbirths. Consequently, policy debates often proceed with incomplete evidence.

The PCPNDT Act emerged as an essential legislative response to misuse of prenatal diagnostic technologies for sex determination. Its objectives remain socially and ethically compelling. Nevertheless, the epidemiological assumptions underlying the discourse on skewed sex ratios warrant re-examination. The presumption that female fetal loss is attributable predominantly to sex-selective abortions and female infanticide may not fully account for the diverse biological, obstetric, and socio-economic determinants of fetal mortality. In the absence of comprehensive facility-based data, the relative contribution of these factors remains difficult to quantify with certainty.

This raises a broader question concerning the validity of morbidity and mortality data employed in health policy. Current estimates are statistically robust within their methodological frameworks and are useful for monitoring trends over time. However, they are not equivalent to complete enumerations of disease and death. They are, in essence, modeled approximations constructed from multiple imperfect sources. Such estimates are indispensable in the absence of better data, yet they should not be mistaken for precise measurements of population health.[23]

The paradox is therefore evident: India possesses an increasingly digitized healthcare infrastructure,[24] but lacks a universal mechanism for transforming clinical encounters into standardized, coded, and analyzable health statistics. Without mandatory ICD coding, uniform certification of causes of death, real-time electronic reporting from all hospitals, and centralized state-wise collation, the promise of digital health will remain only partially fulfilled.

A mature health information system must move beyond survey-based inference towards continuous surveillance. Universal ICD-coded reporting would not merely improve statistics; it would enhance clinical audit, facilitate medico-legal accountability, permit accurate assessment of disease burden, identify regional disparities, and enable rapid public health responses. Such a system would transform health policy from one based predominantly on estimates to one grounded in measurable reality.

CONCLUSION

Maternal mortality, female fetal loss, and sex ratio statistics occupy a pivotal place

in India's public health and medico-legal landscape. Yet the validity of these indicators depends fundamentally on the quality, completeness, and timeliness of the data from which they are derived. At present, India's health statistics are generated through a combination of sample registration systems, household surveys, facility-based reporting, and statistical modeling. These approaches have undoubtedly improved understanding of long-term trends, but they remain imperfect substitutes for universal, real-time, and standardized reporting.

The distinction between legal assumptions and medical realities is especially important in the context of female fetal loss and the PCPNDT framework. While the prevention of sex-selective practices remains an essential public policy objective, attributing skewed sex ratios solely or predominantly to sex-selective abortions and female infanticide risks overlooking the multifactorial nature of fetal loss. Scientific certainty requires comprehensive clinical data rather than presumptions, however well-intentioned.

The widespread digitization of hospitals offers an unprecedented opportunity to transform India's health information ecosystem. However, digitization without mandatory ICD coding, uniform certification of morbidity and mortality, and centralized real-time reporting is insufficient. Electronic records that are neither standardized nor interoperable cannot provide the epidemiological precision required for modern healthcare governance.

This paper therefore contends that India requires a paradigm shift—from periodic surveys and modeled estimates to universal, ICD-coded, real-time health statistics generated from all healthcare institutions. Such a system would not only strengthen maternal and child health policies but would also promote transparency, scientific rigor, and medico-legal accountability. Until this transformation occurs, morbidity and mortality figures will continue to represent the best available estimates rather than definitive measures of the nation's health status. Reliable health statistics are not merely technical instruments; they are the evidentiary foundation upon which equitable and effective health policy must rest.

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