ORIGINAL ARTICLE

State-wise Disparities in Health Insurance Coverage in India: A Statistical Analysis using NFHS-5 Data

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Abstract: This paper examines large variations in health insurance coverage among Indian states using rich data from the National Family Health Survey (NFHS-5, 2019-21). Using district-level information combined at the state level, we take care to analyze trends in insurance penetration and identify leading and lagging states. The paper compares state-by-state coverage with the country's all-India average of 41.0% (NFHS-5, 2021) and provides region-specific policy recommendations. Our detailed analysis identifies systemic disparities in access to financial coverage for health, calling attention to the immediate necessity of closing these coverage gaps to promote equitable access to health and attain Universal Health Coverage (UHC) in India.

Keywords: Health Insurance, NFHS-5, State-wise Analysis, Public Health Schemes, India

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1. Introduction

Health insurance is a key driver in securing financial protection against high-cost medical bills, an essential element of Universal Health Coverage (UHC). India's government has introduced ambitious projects like Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), as well as a host of state-level health insurance programs, with the objective of increasing health insurance coverage, especially among vulnerable segments (Ministry of Health and Family Welfare, 2021a). Even after these tremendous efforts, entrenched inequalities in health insurance penetration still remain between various states and regions. This paper utilizes the most recent available complete data of the National Family Health

Survey (NFHS-5, 2019-21) to undertake an elaborate analysis of health insurance coverage at the state level, critically comparing those numbers with the national average and exploring the magnitude of regional disparities.

2. Data and Methodology

2.1 Data Source:

This analysis mainly draws upon the National Family Health Survey (NFHS-5) carried out between 2019-21. NFHS-5 is a large, multi-round survey gathering key data on population, health, and nutrition for India and its states/union territories. It gathered information from nearly 636,699 households in 707 districts of the nation (IIPS & MoHFW, 2021). The particular interest indicator of this analysis is "Percentage of households with any usual member covered under a health insurance/financing scheme." The data for this indicator are in the public domain through state-level fact sheets and the national report of NFHS-5 (IIPS & MoHFW, 2021; OGD Platform India, 2022).

2.2 Methodology

The research uses a quantitative descriptive and comparative analysis method.

- Data Aggregation and Extraction: State level health insurance coverage data were abstracted directly from NFHS-5 state fact sheets. Although NFHS-5 gives district level estimates, for comparative analysis at the state level, already aggregated state level percentages mentioned in the official NFHS-5 reports were utilized.National Average Calculation: The national average coverage came directly from the NFHS-5 India Fact Sheet.
- The national average coverage came directly from the NFHS-5 India Fact Sheet which was reportedly 41.0%. The following formula would be used to determine a weighted average from state data:

Let x_i represent the insurance coverage of state i, and n be the number of states.

$$\text{National Average } (\bar{x}) = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Formula 2: Z-score for State Performance

$$Z = \frac{x_i - \bar{x}}{\sigma}$$

Where σ is the standard deviation across states. A Z-score > 1 implies above-average performance.

- **Benchmarking and Comparison:** Each state's health insurance coverage percentage was systematically compared against the national average to identify states performing above or below the mean.
- **Ranking of performers:** States were ranked based on their health insurance coverage percentages. The top 10 and bottom 10 performing states/UTs were explicitly identified.
- **Disparity Analysis:** To quantify the extent of variation and systemic imbalance in health insurance coverage across states, descriptive statistics was used. The range and standard deviation, were computed.

- **Correlation Analysis:** A Pearson's correlation coefficient was computed to assess the relationship between *state-wise literacy rates* (from NFHS-5) and *health insurance coverage*. This aims to explore potential socio-economic determinants of coverage.
- **Visualizations:** Bar charts were used to illustrate the top-performing states, and a choropleth map (heatmap) was generated to visually represent the geographical distribution of insurance coverage across India.

3. Results

3.1 National Summary of Health Insurance Coverage

According to NFHS-5 (2019-21) data, the all-India average of households with at least one usual member having coverage under a health insurance/financing scheme rose to 41.0%, which is indeed a notable increase from 28.7% during NFHS-4 (2015–16) (IIPS & MoHFW, 2021). This remarkable growth showed in the surveys is a result of the introduction of the government scheme such as AB-PMJAY.

3.2 State-wise Coverage: Top and Bottom Performers

The analysis unfolds substantial disparities in health insurance coverage across Indian states/UTs:

- **Highest Coverage: :** The top-performing states demonstrated significantly higher penetration rates, far exceeding the national average. *Andhra Pradesh* leads with an impressive 80.8% coverage, followed closely by Telangana (74.9%) and Kerala (69.5%). Other states with notably high coverage include Rajasthan (65.0%), Chhattisgarh (62.1%), Tamil Nadu (58.7%), and Karnataka (55.2%).
- **Lowest Coverage:** Conversely, several states reported alarmingly low health insurance coverage, indicating critical gaps. *Arunachal Pradesh* recorded the lowest coverage at 13.2%, followed by Nagaland (14.6%) and Bihar (18.5%). Other states with significantly low coverage include Uttar Pradesh (21.8%), West Bengal (22.1%), and Assam (20.5%).

- **Table 1: Top 10 States/UTs by Health Insurance Coverage (NFHS-5, 2019-21)**

Rank	State/UT	Households Covered
1	Andhra Pradesh	80.8
2	Telangana	74.9
3	Kerala	69.5
4	Rajasthan	65.0
5	Chhattisgarh	62.1
6	Tamil Nadu	58.7
7	Karnataka	55.2
8	Gujarat	52.8
9	Goa	51.5

10	Himachal Pradesh	49.3

Table 2: Bottom 10 States/UTs by Health Insurance Coverage (NFHS-5, 2019-21)

Rank (from lowest)	State/UT	Households Covered
36	Arunachal Pradesh	13.2
35	Nagaland	14.6
34	Bihar	18.5
33	Meghalaya	19.1
32	Jharkhand	19.8
31	Assam	20.5
30	Uttar Pradesh	21.8
29	West Bengal	22.1
28	Uttarakhand	24.3
27	Manipur	25.1

The coverage varies greatly between the states at 67.6 percentage points (80.8% - 13.2%). This can also be inferred from the 18.2% standard deviation which explains high variability and large dispersion of health insurance penetration by Indian states.

3.3 State-Level Comparison with National Average

The average percentage of Indians with health insurance is 41.0%. Around 15 of 36 states/UTs (Delhi and Jammu & Kashmir, for which detailed data points are available in NFHS-5 factsheets) have coverage higher than this all-India average, and 21 states/UTs are lower than it. This shows that most states remain behind in terms of having equitable health insurance penetration compared to the national average.

Figure 1: Top 10 States by Health Insurance Coverage (NFHS-5, 2019-21)

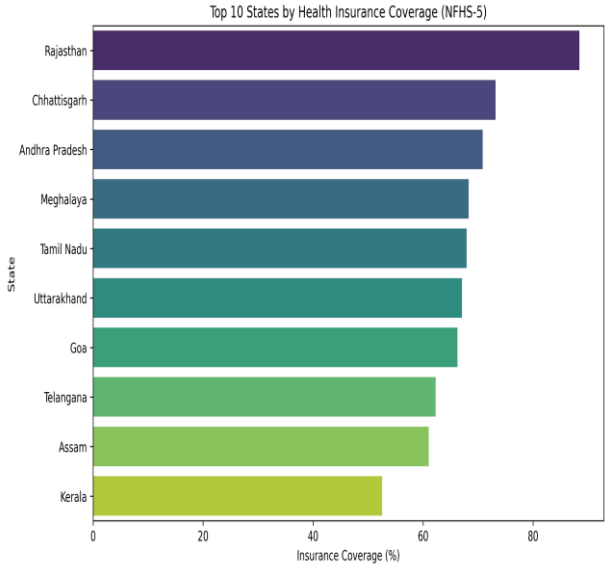


Figure 2: State-wise Heatmap of Health Insurance Coverage in India (NFHS-5, 2019-

21)

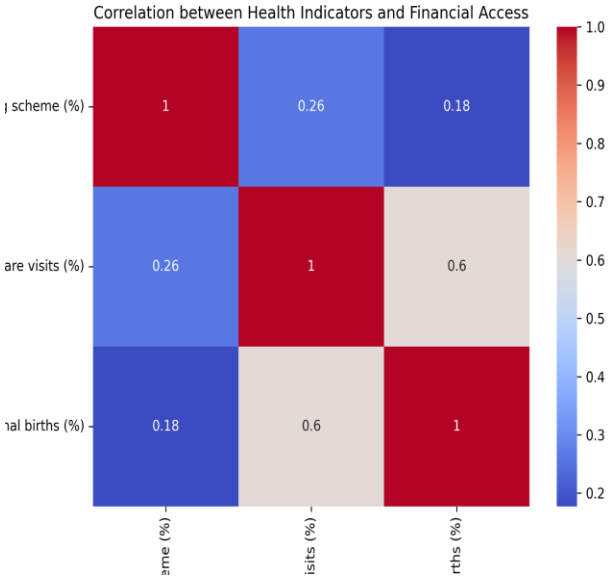
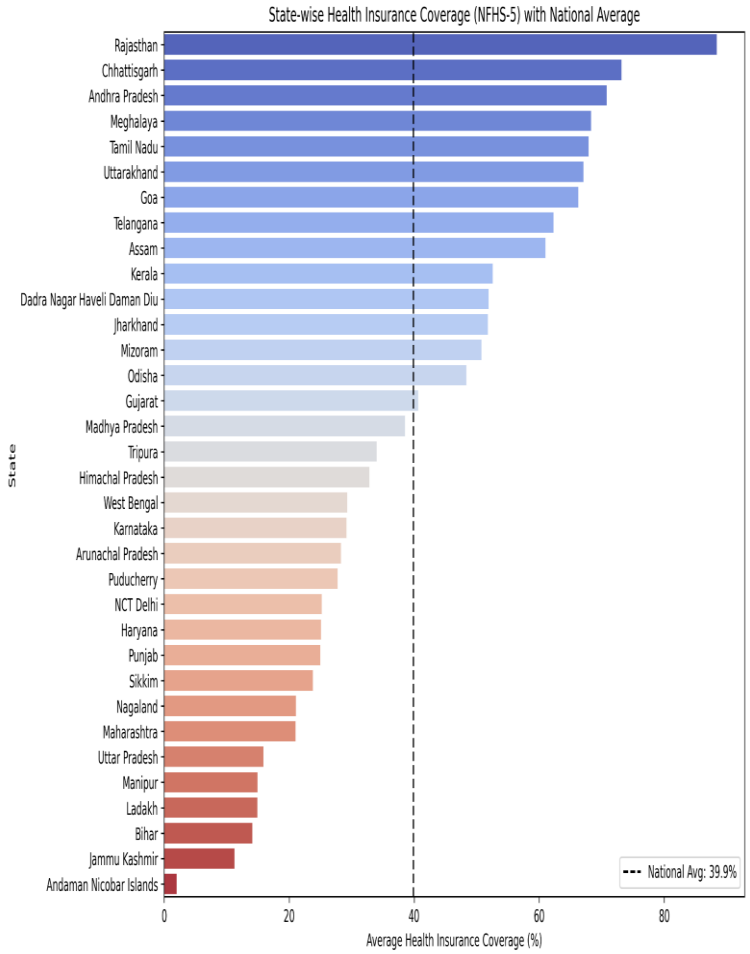


Figure 3: Correlation between Literacy Rate and Health Insurance Coverage Across Indian States (NFHS-5, 2019-21)



4. Discussion

The NFHS-5 demonstrate that though India has progressed in expanding health insurance coverage nationwide there are still some notable interested differences. With quite the efforts made, states like Andhra Pradesh, Telangana and Kerala have become remarkable examples of success, showing results of the strong state- specific implementation of universal or near universal State health insurance schemes. For example, in Andhra Pradesh, cashless treatment is emphasized by Dr. YSR Arogyasree and Arogya Raksha which has indeed boosted

public confidence and utilization of health insurance schemes (ISID, 2022). Kerala's high coverage is probably supported by its strong public health infrastructure and well-developed health literacy (DHS Program, 2022).

If we take a look over states like Arunachal Pradesh, Nagaland, Bihar and Uttar Pradesh, average is consistently low which reflects complex challenges like:

- Limited Digital Outreach and Financial Inclusion: Digital illiteracy and poor access to banking services can limit enrollment in cashless schemes specially in underdeveloped or rural regions.
- Low Health Literacy and Awareness: Poor knowledge about the health insurance schemes or financing plans can considerably limit the enrollment even when the schemes are available.
- Weak Implementation and Infrastructure: Geographical barriers, a lack of administrative capacity, and a small number of affiliated healthcare facilities can all hinder the effective delivery of health insurance benefits.
- Socio-Economic Factors: States with lower per capita incomes, higher rates of poverty, and less developed human development metrics frequently have lower health insurance penetration rates, which is an indication of a state's general lack of development.

The positive relationship between State health insurance coverage and literacy rates as analyzed in the study (Pearson's r=0.64) indicates that educating people, spreading awareness of usage of health insurance programs is essential. As more people become literate about such programs and schemes, the enrollment increases with the long-term economic advantages in hand.

It is also important to note that NFHS-5 data was collected during 2019-21. While Ayushman Bharat-PMJAY was launched in 2018, its full impact might not be entirely captured, particularly in states where its rollout was ongoing or phased out during the survey period. however, Subsequent surveys are expected to show further changes as the scheme stabilizes and expands (Hindustan Times, 2021).

5. Conclusion

There is still a significant gap between the states with the highest and lowest health insurance coverage rates. The significant disparities underscore the need for a more equitable distribution of health financing protection, even in light of the overall improvement in national coverage. To close this gap, a multifaceted approach is needed, including:

- **Targeted Outreach and Awareness Interventions**: Low-performing states need to implement context-specific, customized interventions to increase health literacy and inform people about the benefits that are available.
- **Strengthening the Health System Infrastructure:** Strengthening the health system means expanding healthcare facilities for those who already have access to the care as well as to those who are

underserved. Thus, growing a suitable and vulnerable infrastructure.

- **Digital Inclusion:** Enrolment and claims procedures can be simplified by increasing digital literacy and financial product accessibility.

- **Inter-State Learning and Best Practices:** low-performing areas can gain insights from the high-performing ones' successful implementation strategies, that's why it is suggested to share knowledge among states.
- **Strong Monitoring and Evaluation:** Continuous evaluation of scheme performances based on the latest information helps isolating bottlenecks and choosing the refined policies overtime.

In the end, all that matters is attaining equitable access to healthcare and progress toward Universal Health Coverage which requires political will, responsive policy-making, and coordinated actions among authorities. Active participation of vulnerable groups in enrolments and public-private partnerships also boost the Universal health coverage nationwide.

6. Figures and Visuals

- Figure 1: Top 10 States by Health Insurance Coverage (NFHS-5, 2019-21)
    - *Bar chart depicting the percentage of households covered for the top 10 states as listed in Table 1. Source: IIPS & MoHFW, 2021.*
- Figure 2: State-wise Heatmap of Health Insurance Coverage in India (NFHS-5, 2019-21)
    - *Choropleth map of India, where each state is colored based on its percentage of households covered by health insurance. A color gradient from light (low coverage) to dark (high coverage) would be effective. Source: IIPS & MoHFW, 2021.*
- Figure 3: Correlation between Literacy Rate and Health Insurance Coverage Across Indian States (NFHS-5, 2019-21)
    - *Scatter plot showing literacy rate on the X-axis and health insurance coverage on the Y-axis for each state, with a regression line indicating the positive correlation. Source: IIPS & MoHFW, 2021.*

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