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Understanding the Child Health Disparities across Indian States: A Socio-Economic Perspective

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Abstract:

Scatter diagrams were used to explore relationships between these indicators. The visual analysis reveals correlations between socio-economic variables and health outcomes, such as the link between per capita income inequality and IMR, or literacy rates and health inequality. Wealthier states, like Kerala and Tamil Nadu, exhibit better health outcomes, including lower IMR and improved healthcare access. In contrast, poorer states like Bihar, Uttar Pradesh, and Madhya Pradesh show higher IMRs and limited healthcare infrastructure. Educational indicators, such as literacy and enrollment rates, correlate with better health outcomes, highlighting the importance of education in improving child health.

The research highlights the importance of health and explains inter-state health inequality variations, examining whether factors like NER, GER, literacy rate, per capita income, and IMR contribute to the patterns observed across Indian states.

Keywords: Human Development, Health Inequality, Indian States, Scatter Diagrams.

Introduction:

Health and human development are closely linked. Good health helps people attend school, work productively, and live better lives, which support economic and social development (WHO, 2021). On the other hand, poor health can trap people in poverty by limiting education and job opportunities [UNDP, 2020]. At the same time, higher levels of education, income, and living standards improve health by giving better access to food, clean water, and healthcare. Educated people also make better health choices. Reducing health and income inequalities is key to breaking the cycle of poverty and supporting long-term development. (UNDP, 2022).

Scope and Objective:

There are so many literatures on child health inequality. Most studies offer national-level data, but there is a gap in state-level studies or limited research work specifically on state-level that assess how socio-economic factors influence child health outcomes across Indian states. There are notable differences between India's states in socio-economic development, healthcare infrastructure, educational attainment, and income distribution. These area-based differences suggest that health inequalities in India cannot be fully understood from a national perspective. But state-level analysis would help pinpoint the factors behind health

inequalities across different states, enabling more state-specific policy actions. The literature gap indicates a need for more comprehensive, state-specific studies that consider explore the interrelationship between socio-economic, educational, and infrastructural factors in determining health inequalities.

Our objective in this article is not only to examine child health inequality, but also to identify and analyze the socio-economic and educational factors responsible for the significant inter-state variations in health outcomes. In the literature addressing this problem is not new there are so many theoretical and empirical researches have already been done in this area. In India Ongoing studies on health disparities has provided valuable insights into the relationship between socio-economic factors and health outcomes, but despite this several major key gaps persist.

- The main purpose of this research will be to study the overall inequality across state in India during 2000s and to investigate into the underlying factors to which such variations can be attributed child health inequality.

Data and Methodology:

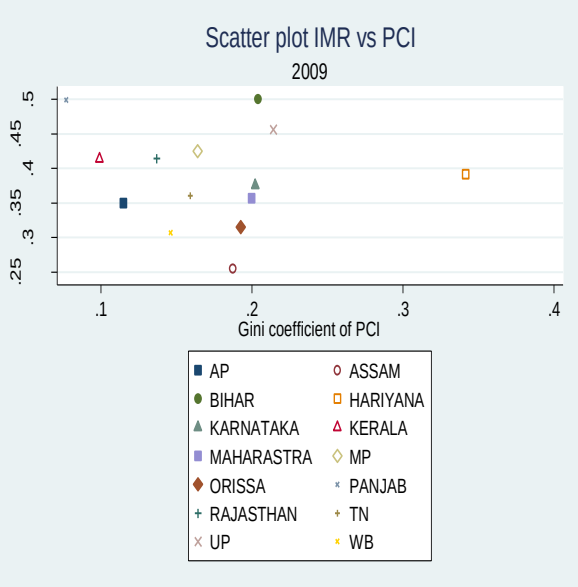
This study analyzes inequality in health and socio-economic indicators across 15 Indian states from 2009 to 2019 using district-level data. Gini coefficients are calculated for Infant Mortality Rate (IMR), Per Capita Income (PCI), Gross and Net Enrollment Ratios (GER, NER), and literacy rate to measure disparities. IMR reflects health inequality, while PCI and education indicators represent economic and human development gaps. A low Gini value shows balanced development across districts; a high value indicates sharp regional differences.

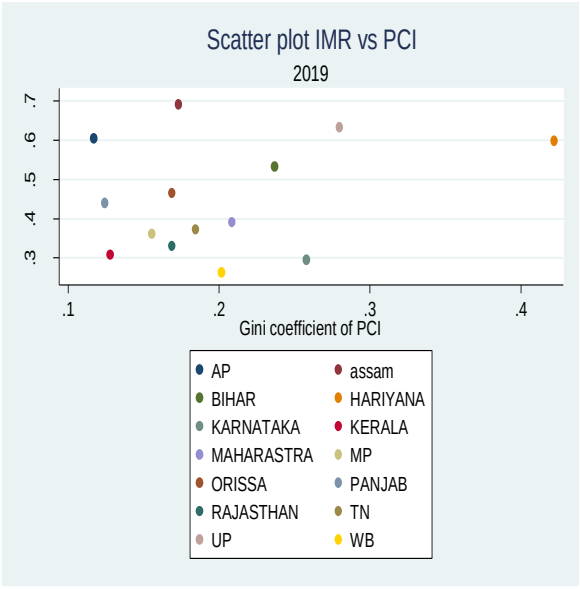
Result and Discussion:

This study highlights the significance of intra-state inequalities in understanding broader disparities across Indian states through scattered diagram. This allows for an understanding of how income distribution, health outcomes, and educational attainment vary within states. By scatter plotting the data, the following trends or relationships can be analyzed as follows-

Possible explanatory Factors and Relationships:

a) This plot shows the relationship between Infant Mortality Rate (IMR) and Per Capita Income (PCI) for different states.

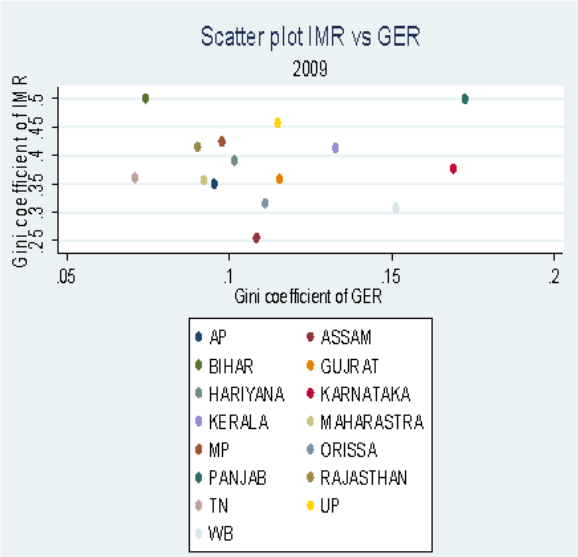


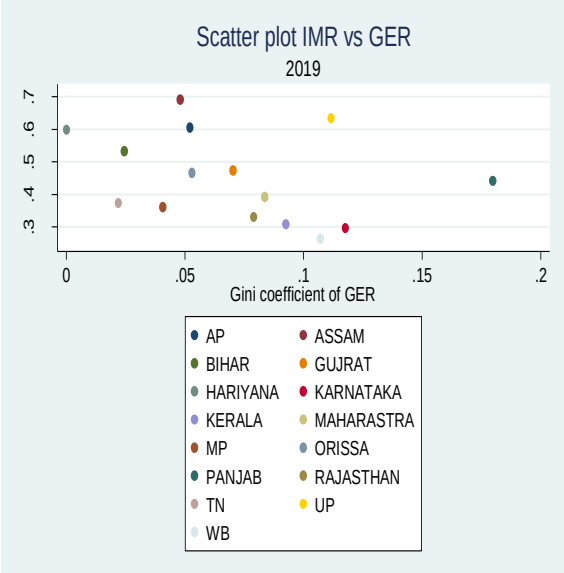


Here are the scatter diagrams for IMR vs PCI for 2009 and 2019. In 2009 the plot shows the relationship between Per Capita Income (PCI) and Infant Mortality Rate (IMR) across states. Lower PCI values tend to have higher IMR, with some exceptions.

Similarly, in 2019 the relationship between PCI and IMR is depicted the clustering pattern has shifted slightly, with some states moving towards lower IMR as PCI increases. In both years, there seems to be a general negative trend: states with higher PCI often have lower IMR. From 2009 to 2019, there are visible shifts, reflecting economic and social development in some states. States like Kerala, Karnataka, and West Bengal show balanced progress in economic and health outcomes. States like Haryana and UP experienced economic growth but failed to improve or worsened their health outcomes. States like Assam and Odisha exhibit dual deterioration, with worsening health and stagnating economy.

b) This plot shows the relationship between Infant Mortality Rate (IMR) and Gross Enrollment Ratio (GER) for different states.



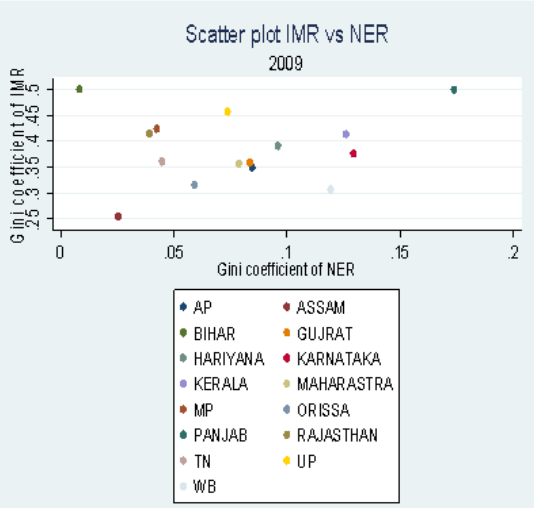


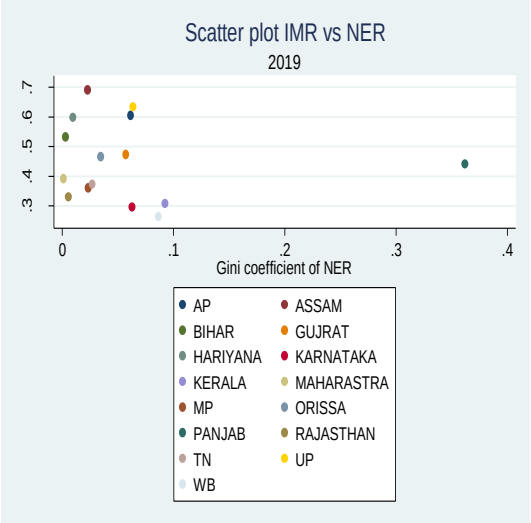
The scatter diagrams compare IMR (Infant Mortality Rate) against GER (Gross Enrollment Ratio) for 2009 and 2019.

GER values were generally higher in 2009 compared to 2019.The correlation between GER and IMR was weak, with states scattered widely. GER values dropped for most states in 2019, while

IMR increased for several states. There appears to be a weaker clustering, indicating further divergence in health and education outcomes. States with higher GER in 2009 tended to have lower IMR (e.g., Kerala, Karnataka).In 2019, some states saw an increase in IMR despite low GER (e.g., Haryana, UP).

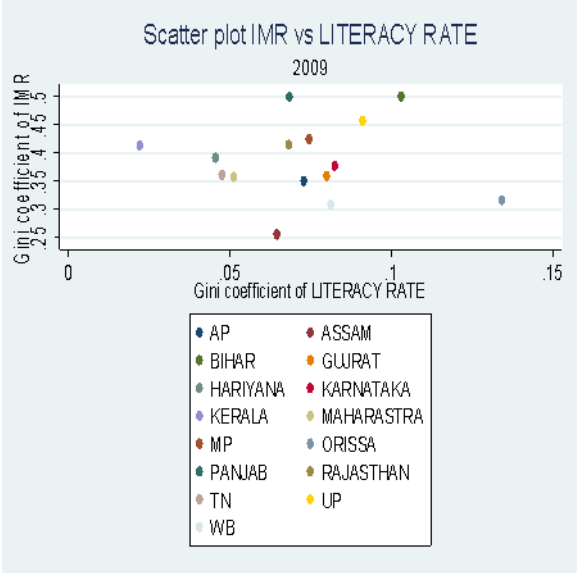
c) This plot shows the relationship between Infant Mortality Rate (IMR) and Net Enrollment Ratio (NER) for different states.

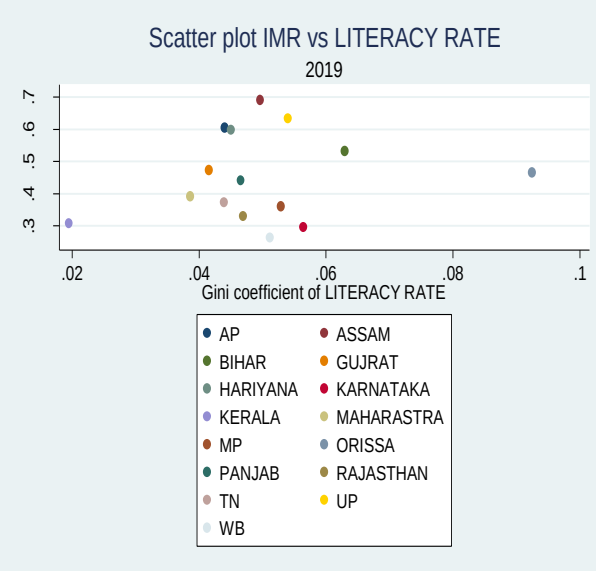




Kerala and Karnataka stand out with improvements in both health (IMR) and education (NER). Punjab also shows improvement in both areas. Many states like Bihar, Haryana, Rajasthan, and Maharashtra face a significant decline in NER, suggesting challenges in educational reforms. States like Odisha, Gujarat, and UP show mixed trends, improving in health but facing stagnation or deterioration in education. This analysis highlights that while some states have made progress in improving both health and education, others have experienced setbacks, especially in educational enrollment.

d) This plot shows the relationship between Infant Mortality Rate (IMR) and Literacy Rate for different states.





States like Kerala and Punjab have relatively low IMR and moderately higher literacy rates compared to others. Bihar, UP, and Madhya Pradesh are clustered on the higher IMR and lower literacy rate side. States like Karnataka, Kerala, Odisha, and Madhya Pradesh have made notable progress in reducing IMR, indicating effective healthcare interventions. Many states, including Maharashtra, Punjab, Bihar, and Uttar Pradesh, saw a decline in literacy over the 10-year period. This suggests that educational systems need more focus, especially in regions with improving health outcomes. States like Odisha and Karnataka have made significant strides in both sectors, showing that it is possible to achieve progress in both health and education with the right policies and investments.

Health and education improvements are crucial for long-term socio-economic development. States that have achieved progress in both areas offer valuable insights into integrated development policies.

Conclusion:

States with higher per capita income tend to have lower IMR, indicating that economic development plays a significant role in improving health outcomes. However, simply increasing income is not enough—investment in healthcare infrastructure and social services is essential.

Both education enrollment ratios (GER & NER) and literacy rates show a moderate to strong negative correlation with IMR. This suggests that educational interventions, especially targeting women and girls, can play a pivotal role in reducing IMR by fostering better health practices, improving awareness, and enhancing access to healthcare.

A multi-pronged approach, focusing on improving economic conditions, increasing access to education, and enhancing healthcare services, is necessary to address infant mortality effectively. This includes investing in healthcare infrastructure, improving maternal health education, and ensuring that both health and education systems are accessible to all segments of the population.

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