Beyond the Poverty Line: Key Predictors of Maternal Mortality in India

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Motivation

Allocation of scarce resources - how to allocate public health expenditure?

Currently, most maternal welfare schemes in India are targeted at Below-Poverty-Line families, i.e. income is the cut-off point for access to these schemes.

However, studies (Meesham et al. 1999, Claeson et al. 2000, Padmanaban 2009) suggest that family income might not be the best predictor of maternal mortality.

Institutional factors at the district or state level could be better predictors

     -Tamil Nadu's success (Padmanaban 2009)

     - Access to maternal health interventions (Claeson et al. 2000)

Research Question

1) What are the key predictors of maternal mortality in India?

2) How do we use these to identify an at-risk cluster and target maternal welfare schemes at them?
   - Challenge - how to we ascertain whether it was access to welfare schemes that lowered risk?

Data

- National Family Health Survey (NFHS):
  - ~20,000 families surveyed, once a decade
  - 4 waves of data available - newest in 2015-16 (very few research outputs!)
  - Individual-level variables such as previous pregnancies, lifestyle, usage of maternal healthcare, income, etc.

- District Level Health Survey (DLHS):
  - every 5 years
  - district-level variables such as sanitation, spread of govt. hospitals, per capita income, access to public health schemes, etc.

- Sample Registration System (annual) : district-level maternal mortality rates

Methods

Logistic Regression

Non-Linear Relationships? (Song et al. 2004, Liu et al. 2014)

      Principal Component Analysis to reduce dimensionality

      Decision Trees for Prediction

      Single Layer Perceptron

Comparison between predictive ability of individual-level characteristics and district-level characteristics

What's new?

Very little research on NFHS IV data (2015-16)

Very few studies applying machine learning to predicting health outcomes from socioeconomic variables

Questions?