ESSAYS ON DISEASE BURDEN ESTIMATION AND HEALTHCARE QUALITY IN INDIA

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ABSTRACT

Over the past two decades, India has registered a significant increase in the life expectancy of its population, up from 60.44 to 68.3 years. Though the increase represents an improvement in India's health system and infrastructure, yet it lags by more than 15 years from the ideal life expectancy in Japan. More than global benchmarking, the greater concern is the intra-country disparity in life expectancy that ranges from 65.5 (Assam) to 77.8 (Kerala) within the Indian states. The discrepancy can be attributed to the variation in the prevalence of communicable and non-communicable diseases, access to health facilities, and poor service and technical quality of healthcare services and other factors.

Though the efforts to estimate and mitigate healthcare system issues have been significantly scaled at the national level, regional bodies remain under-equipped to make evidence-based policy decisions. Our first part of the study is a step forward in this direction to estimate the burden of selected diseases on major Indian states. Conceptually, the study is in line with the Global Burden of Disease (GBD) enterprise but its assumption on life expectancy and population structure keeps it more grounded to the Indian realities. Disease burden calculation using global life expectancy and population structure instead of local may lead to the overestimation of the burden share of non-communicable diseases (and underestimation of communicable). We further propose a method to decompose the change/difference in burden into 'population structure', 'death rate' and 'age at death' to map the change to its cause. Further, decomposition method is employed for two sub-studies: 1) inter-temporal analysis between 1995 and 2014, and 2) spatial analysis in 2014 for major Indian states.

The ultimate goal of disease burden estimation is to develop an efficient proactive healthcare system that can aid in the reduction and control of disease burden. Unfortunately, in developing countries,

under-utilization of healthcare services is a major challenge in disease burden reduction. There is plenty of literature on the demand-side barriers to healthcare utilization, such ashigh out-of-pocket expenditure (OOP), distance from a health facility, education, opportunity cost and cultural aspects. In an attempt to lessen these barriers and provide comprehensive health service, various tailor-made health insurance schemes took shape in different parts of the world. In India, *Rashtriya Swasthya Bima Yojna* (RSBY) (National Health Insurance Scheme) is one such scheme that has potential to serve as a universal health coverage scheme. Since its inception, the scheme has received tremendous attention from the research community. Extant literature provides several pieces of evidence related to enrollment issues, OOP payments, coverage and utilization. Our second study is placed from the perspective of the beneficiary, who is the chief stakeholder of the scheme, and goes deeper to explore the intended and unintended consequences of the scheme. We intend to answer three questions: What are the factors providing patient satisfaction under the scheme? Who is charged more than prescribed? and, Who bears the highest disease burden among the beneficiaries?

The first part of the study calculates disease burden estimates for the years 1995, 2004 and 2014 by means of the Disability Adjusted Life Years (DALY) method using data from Sample Registration Survey (SRS), Medically Certified Cause of Death (MCCD) database, and other literature sources for selected diseases. The second study uses data from post-hospitalization survey and RSBY insurance claim records from 2013 to 2015 from the state of Chhattisgarh, India. This paper employs fuzzy set Qualitative Comparative Analysis (fsQCA) to determine causality and the configuration of causal conditions leading to the outcome.

Temporal analysis shows an overall decline in the burden due to selected diseases by 37 percentage points from 1995-2014. Decomposed results indicate wide diversity among states in bearing the burden of communicable and non-communicable diseases with rising rate of burden due to injury.

Spatial analysis reveals that states with high communicable burden are on the fringe of acquiring high non-communicable burden as well. In contrast to the GBD report (2017), we find a higher share of communicable and lower share of non-communicable disease burden. Findings of the study would be useful in tailoring healthcare expenditures at the regional level, based on population health needs, and thus improving allocative efficiency of health systems.

In the second study, provision of medicine emerges as a necessary condition for patient satisfaction. Waiting time, which is a standard measure of hospital service quality in developed countries, did not emerge as a necessary parameter of satisfaction. Overcharging in case of minor surgical procedures is observed irrespective of beneficiaries' education and occupation status. The results have implications for policymakers for scheme improvement. The study can be extended further to develop a health service quality scale for developing countries like India where the standards and service expectations are different from that of the developed world.

Keywords: Healthcare, Disease Burden, DALY, beneficiary satisfaction, decomposition

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GLOSSARY

COPD: Chronic obstructive pulmonary disease

DALYs: Disability-adjusted life years

GBD: Global Burden of Disease

ICMR: Indian Council of Medical Research

IHME Institute for Health Metrics and Evaluation

IMR: Infant Mortality Rate

LRI: Lower Respiratory Infection

MCCD: Medical certification of cause of death

NCDs: Non-communicable diseases

PHFI: Public Health Foundation of India

RSBY: Rashtriya Swasthya Bima Yojna

YLDs: Years lived with disability

YLLs: Years of life lost

Definitions:

DALY: Years of healthy life lost to premature death and suffering. DALYs are the sum of years of life lost and years lived with disability.

Disability weight: Number on a scale from 0 to 1 that represents the severity of health loss associated with a health state.

Delta YLL: Change/difference in years of life lost.

Global Burden of Disease (GBD) study: A systematic, scientific effort to quantify the comparative magnitude of health loss due to diseases, injuries, and risk factors by age, sex, and geographies for specific points in time.

Years of life lost (YLLs): Years of life lost due to premature mortality.

Years lived with disability (YLDs): Measure of years lived with disability due to a disease or injury, weighted for the severity of the disability.

IMR: The number of deaths of infants under one year old in a given year per 1,000 live births in the same year.

Sequelae: Consequences of diseases and injuries.

Risk factors: Potentially modifiable causes of disease and injury.

Population Age Structure: Proportion of population in different age groups.

Change in burden due to age structure: Change in disease burden attributed to change/difference in age structure over time or space.

Change in burden due to Age at Death: Change in disease burden (occurs over time or space) attributed to change/difference in age at which death occurs.

Change in burden due to Death Rate: Change in disease burden (occurs over time or space) attributed to change/difference in crude death rate.

Crude Death Rate: The crude death rate is the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year.