Contextualizing Mortality: Trends in Adult Mortality During the 21st Century

Background:

Socio-economic disparities in mortality are well recognized in developed as well as developing countries. People living in households with higher economic status enjoy lower mortality than their counterparts. Apart from the economic factors, other socioeconomic and demographic factors like age, sex, marital status, educational level, employment status, and occupation are considered to be reliable individual-level predictors of mortality risk. Barik et al. (2018), using two waves of the India Human Development Survey (IHDS) panel found that economic status contributed significantly to reducing adult deaths. The effect of economic status was robust even in the presence of a chronic illness, which had a potential negative effect on mortality. The other factors that contributed positively to reducing adult deaths were being women, attaining a higher education level, and currently working. Adults who belonged to higher age groups, widowed, divorced/separated, or Adivasis (Scheduled Tribes) were more vulnerable to premature deaths. Mortality did not differ significantly between urban and rural residents.

A major reason for this elite advantage in adult mortality in India relies on the fact that the health system does not serve the healthcare needs of the population, particularly the poor and the vulnerable. This leads to higher utilization of private care and huge out-of-pocket payments across all population groups. To bridge this gap, India promised to increase healthcare spending and aimed at reaching universal access to healthcare through health insurance in the early decade of the twenty-first century. Along with different state-level health insurance schemes, the central government-sponsored health insurance scheme, the Rashtriya Swasthya Bima Yojana (RSBY) was introduced in 2007. Under RSBY, up to five members of a poor family were extended insurance coverage of INR 30,000 annually to meet the hospitalization expenses. Later, in 2017, the RSBY scheme was upgraded to Pradhan Mantri Jan Arogya Yojana (PMJAY), which provides an extended annual coverage of INR 500,000 to the beneficiaries. Under this scheme, all members of the insured family were eligible to get the benefit with a maximum coverage of INR 500,000 annually. This was expected to reduce the mortality among the poor and vulnerable groups who otherwise might not able to afford healthcare.

Simultaneously, the world suffered a huge loss of lives and livelihoods due to the COVID-19 pandemic during the early years of this decade. India was no exception. Frequent lockdowns and the dreadful effect of the COVID-19 virus led to large-scale health calamities, particularly in urban India. The health facilities were running out of beds and the common people were afraid of going out. Several healthcare facilities were closed down to prevent infection. This posed a tremendous challenge to health care access for everyone, regardless of their economic conditions and it was difficult to obtain reproductive health services as well as emergency health care during the pandemic.

Additionally, the pandemic affected urban residents more than rural residents. Greater wealth in urban areas was not enough to protect urban residents. It seems likely that this might have dampened income differentials in mortality.

Under these circumstances, the we would expect a change in socio-economic disparities in mortality with a decline wealth advantages. In this paper we compare the role of various SES and demographic factors in reducing adult mortality over the period 2004 to 2024 The specific questions we try to answer are –

1. Did inequalities in mortality based on individual characteristics change between the first and second decades of the 21st century (i.e. for deaths between 2004-2011 and between 2011-2024).
2. Did urban and rural areas experience similar trends in mortality during the same period?

DATA AND METHODS

We analyses data from three rounds of the India Human Development Survey (IHDS) – 2004-05, 2011-12, and 2022-23 in this paper. IHDS is a multi-topic panel survey of more than 40,000 households across the country. Deaths were identified based on tracking data, collected in 2011-12 and 2022-23 where current status information for household members in the prior wave was collected. The analysis is based on 132,116 adults of age 15 years or above in the 2004-05 survey (wave 1) and 132,248 adults from the 2011-12 survey (wave 2) from 33 states and UTs where the survey was conducted. This includes all the adults, who were successfully traced. Selective attrition has also been analyzed, but not included here due to page limitations.

During the IHDS tracking survey, the current residential status of all the members of previous panel households is ascertained. The information is collected in the following categories –

1) Member of the current household, 2) Member of a new household in the same locality (PSU), 3) Member of a new household in a different locality (PSU) in the same city, 4) Moved out of the village or city (PSU), 5) Died, 6) Unable to identify the member, 7) Merged with another IHDS household in the locality, and 8) Female member, who moved to a different household in the same village or neighborhood of the city after marriage.

The dead members were recorded as code '5'. The current status of each member of the previous wave was collected from an adult household member, usually the head of the household. The information was collected from extended family members, neighbors, friends, or relatives in cases where the whole household migrated out, all members of the household died or households were not available for interview due to other reasons. Members, whose current status cannot be ascertained either from household members or neighbors, friends, or relatives were excluded from the analysis.

ANALYTICAL PLAN AND VARIABLE DESCRIPTION

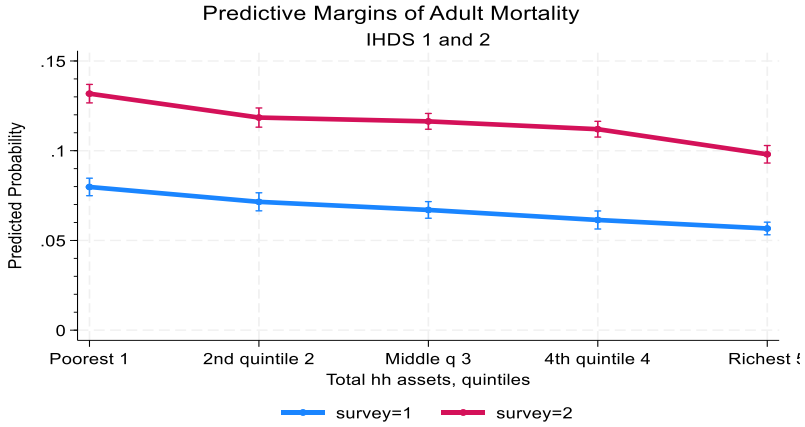
We have carried out bivariate analysis and multivariate logistic regression analysis with village-level death clustering.
Dependent variable: Panel member alive at Wave t and dead by Wave t+1
Co-variates: sex of the person, age, marital status, educational attainment, working status, morbidity status, household religion/caste identity, asset level, place of residence – rural/urban, and state of residence. We control for the presence of either hypertension, diabetes, or heart disease in the prior wave. All the covariates used to predict mortality between waves t and t+1 come from wave t to reduce the potential endogeneity bias.

MAJOR FINDINGS

Findings 1: Wealth Still Protects from Death, but less than before.

Household economic status (asset ownership) still plays an important role in averting deaths. Adults from households having higher asset ownership are less prone to die than those having low

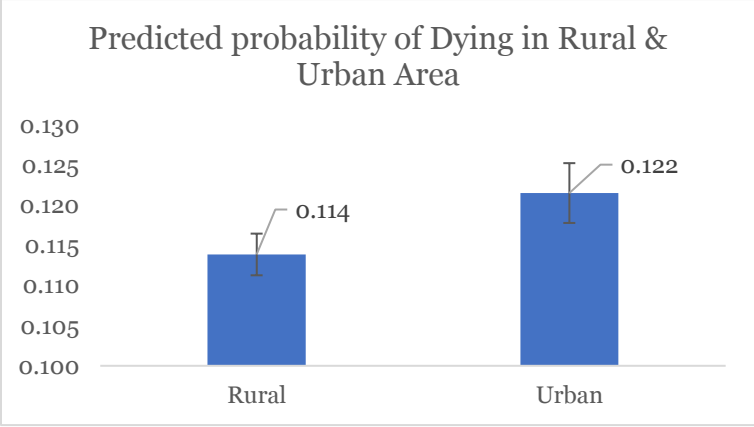
asset ownership. The asset is considered a marker of the sustained wealth status of a household and is least affected by income level. However, the reduced magnitude of the coefficient suggests that between the last two IHDS rounds, the role of asset ownership has declined (see Table 1).



Explanations: Pro-poor institutions of healthcare financing may have played a role in mitigating the rich-poor gaps.

Findings 2: Geographic Differences in Adult Mortality Have Widened

Controlling for socioeconomic advantages, the difference in mortality between urban and rural residents was not statistically significant before 2011 but in recent periods urban mortality was significantly higher than the rural areas.



Why are urban residents disadvantaged in the most recent period?

- Access to healthcare financing schemes is much greater in rural areas than in urban areas, resulting in greater health improvements in rural areas. Mohanty et al. (2023) estimated health insurance coverage in rural and urban areas at 38.6% and 27.6% respectively during 2019-21.
- Moreover, Mohanan et al. (2020) found that major cities experienced greater rates of COVID-19 infection increasing urban disadvantage.

Findings 3: Educational Differentials have Widened

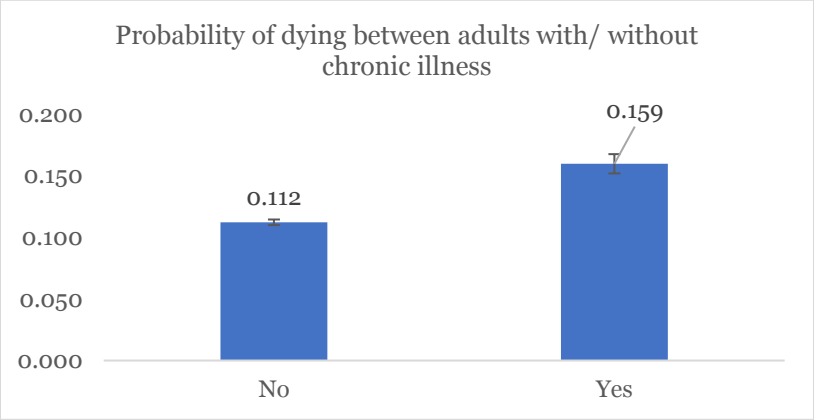
Education continues to be associated with decreased mortality but controlling for wealth, poor education is associated with higher mortality

	Between Wave 1 & 2		Between Wave 2 & 3	
	Coefficients	SE	Coefficients	SE
Education level (Illiterate omitted)				
Up to 5th Std.	-0.193**	0.049	-0.247**	0.037
Secondary level	-0.407**	0.060	-0.462**	0.042
Metric but non-graduate	-0.734**	0.108	-0.837**	0.075
Graduate & above	-0.818**	0.106	-0.761**	0.075
Missing Values	0.321*	0.132		

Explanation: Education might have played an important role in protecting against COVID-19 infection and speed of hospitalization, above and beyond its historic role in enhancing health

Findings 4: Adults with Chronic NCDs are Slightly More Vulnerable than before

Chronic NCDs were and still are the major contributors to adult deaths. However, the vulnerability of death associated with chronic non-communicable diseases increased significantly during waves 2 & 3.



Explanation: There was an increased susceptibility to COVID-19 death among people with pre-existing health conditions. Moreover, persons with such illnesses were not able to access healthcare due to widespread lockdowns and closure of health facilities.

Caution: Preliminary Results – Should Be Interpreted Cautiously

The results are based on preliminary and incomplete data. The cleaning and validation of the data are still underway. Data collection for wave 3 was completed in mid-June, 2024. Selective attrition was analyzed but not incorporated due to space constraints.

Reference:

Barik, D., Desai, S., & Vanneman, R. (2018). Economic Status and Adult Mortality in India: Is the Relationship Sensitive to Choice of Indicators? *World Development*, *103*, 176-187.

Mohanan, M., Malani, A., Krishnan, K., & Acharya, A. (2020). Prevalence of COVID-19 in rural versus urban areas in a low-income country: findings from a State-Wide study in Karnataka, India. *MedRxiv*, 2020.2011. 2002.20224782.

Table 1: Log odds of adult mortality between IHDS Wave 1,2 and IHDS Wave 2,3.

	Wave 1 & 2		Wave 2 & 3	
	Co-efficient	**SE**	**Co-efficient**	**SE**
Ownership of Assets	-0.039**	0.006	-0.025**	0.003
Morbidity (No omitted)				
Yes	0.552**	0.095	0.570**	0.043
Sex (Male omitted)				
Female	-0.829**	0.051	-0.955**	0.035
Age (15–29 years omitted)				
30–44 years	0.606**	0.120	0.954**	0.071
45-59 year	1.597**	0.114	1.907**	0.072
60 years or more	2.869**	0.111	3.294**	0.074
Education level (Illiterate omitted)				
Up to 5th Std.	-0.193**	0.049	-0.247**	0.037
Secondary level	-0.407**	0.060	-0.462**	0.042
Metric but non-graduate	-0.734**	0.108	-0.837**	0.075
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Missing Values	0.321*	0.132		
Marital status (Married omitted)				
Unmarried/married, no Gauna	-0.094	0.115	0.215**	0.073
Widowed	0.584**	0.055	0.620**	0.040
Others	0.813*	0.332	0.487**	0.176
Social group (Forward caste omitted)				
OBC	-0.042	0.053	0.002	0.043
Dalit	0.047	0.059	0.085	0.046
Adivasi	0.321**	0.075	0.215**	0.057
Muslim	-0.131*	0.064	-0.157**	0.053
Christian and Others	-0.041	0.102	0.064	0.079
Place of residence (Rural omitted)				
Urban	0.085	0.052	0.151**	0.034
Work status (Not working omitted)				
Working	-0.678**	0.049	-0.689**	0.034
Constant	-3.057**	0.182	-2.673**	0.119
Observations	132,116		132,248	
Chi2	7157.9		10202.6	
DF	42		41	

** p<0.01, * p<0.05

All models include state dummies. Results are not shown for parsimony.