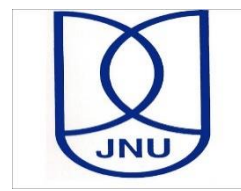




Wittgenstein Centre
FOR DEMOGRAPHY AND
GLOBAL HUMAN CAPITAL
A COLLABORATION OF IIASA, VID/OAW, WU



**9th Demographic Conference of "Young Demographers"
Actual Demographic Research of Young Demographers (not only) in Europe
Faculty of Science, Charles University, Albertov 6, Prague 2, Czech Republic**

15th and 16th February 2018

Under-five Mortality in Indian Districts: A Comparative Study between Deprived and Non- deprived Castes

Jayanta Kumar Bora,^{1,2} Sanghmitra Sheel Acharya,^{1,3} Nandita Saikia^{3,4}

¹Indian Institute of Dalit Studies, New Delhi,

²Demography group, Vienna University of Economics and Business, Vienna, Austria,

³ Jawaharlal Nehru University, New Delhi,


⁴ International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria


Outline

- ❖ **Background**
- ❖ **What is deprived and non-deprived caste**
- ❖ **Why does caste matter for under-five deaths**
- ❖ **Objectives of the study**
- ❖ **Data and Methods**
- ❖ **Results**
- ❖ **Discussion & Conclusion**

Background

- 
- Although infant and under-five mortality (U5M) has been *declining* in India in recent decades, this decline is *not equally distributed* across geographic regions and social groups in India

- 
- There are *ample literature* investigating *trends and disparities* in child mortality in India and provides a great deal of information on child mortality trends and patterns

- 
- Most of the previous studies emphasized *individual level* data such as NFHS, DLHS and addressed individual level determinants of under-five mortality risk

Background

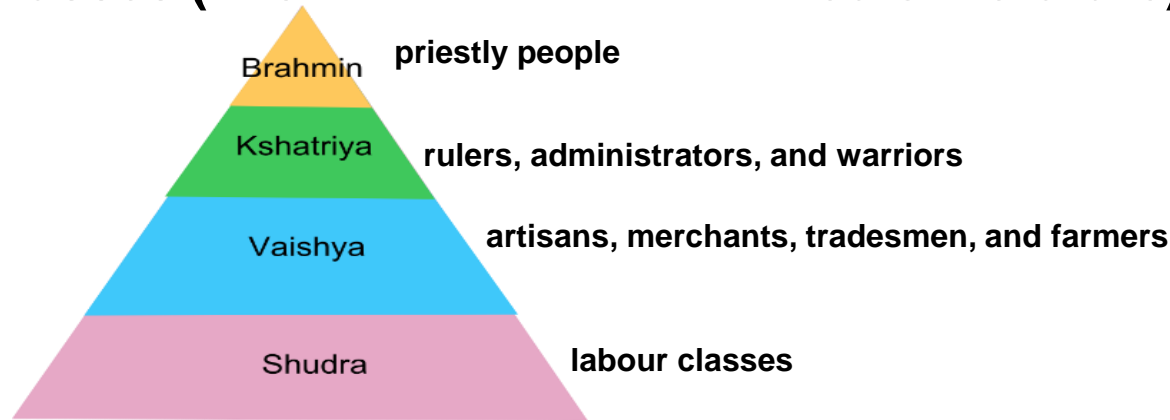
- 
- This study extends current knowledge of U5M in *several directions* with a special focus on the caste composition of Indian districts

- 
- First, we used indirect demographic technique. 2ndly, examine the district-level determinants of the U5MR with the presence of deprived castes and tribes

- 
- Lastly, it quantified how great a role the presence of these deprived castes/tribes population plays in terms of U5M reduction.

Deprived and non-deprived caste

- In India, the caste system, which has existed for more than 3000 years, is a traditional system of social segregation, which works on the principle of purity and pollution.
- Traditional Hindu society is compartmentalized into four hierarchical classes (known as “Varna’s” in Vedic literature)



- Any person outside the caste system is a “Dalit” or “untouchable” and is at the bottom of the caste pyramid
- Although the concept of untouchability originates from Hinduism, untouchability is present to this day among *Indian Muslims and Christians* (George, 2015; Trivedi et al., 2016).

Deprived and non-deprived caste

Officially, dalits are known as “Scheduled Castes (SC)”.

According to the Hindu mythology, this is the fifth category in the Varna System.

They are called Ati Shudras (Untouchables) and were involved for all dirty and polluting jobs

Another distinct population group outside the caste system are Adivasi, officially known as “Scheduled Tribes (ST),” who historically lived as tribes in forest areas.

According to the 2011 Census of India, together they constitute 25.2 percent of the total population of India (SCs contribute 16.6 percent and STs contribute 8.6 percent)-categorized as *deprived castes* as they have traditionally suffered from social exclusion

Their progress in terms of socioeconomic *development is much slower* than that of other social groups

Although the Constitution of India has sought to reduce discrimination against SC/ST people through **positive discrimination** since the time of the country’s independence, SC/ST populations continue to face various forms of exclusion and associated deprivation

Why does caste matter for under-five deaths ?

The public-health and population literature assesses the effect of caste status on mortality and healthcare in India.

Studies shows that **SC/STs are substantially less well-off** than other social groups in the country

Their life expectancy is also lower and child mortality is higher

Children from these groups are **more undernourished** compared to the general population

Children and women belonging to lower castes have **higher risk of death** and a lower rate of utilization of antenatal and delivery care (Dommaraju et al., 2008) .

Their depressing health situation may be due to **social discrimination** and level of parental education

From the previous literature, it is found that no other study has estimated under-five mortality for deprived castes at the district level.

This study thus extends existing knowledge regarding the nexus between caste and under-five mortality

Objectives of the study

To compare the under-five mortality of deprived social groups (Scheduled Castes and Scheduled Tribes) with that of non-deprived (rest of the population) social groups of population at the district level in India

To examined the association between the presence of deprived social groups and the under-five mortality rate by gender at district level

Data and Methods

Data

- Fertility Series data (F-1, F-5, and F-9 for overall, Scheduled Caste (SC) and Scheduled Tribe (ST) population) from the Census of India, 2011, has been used to indirectly estimate the under-five mortality rate in 35 Indian states and 640 districts
- The Fertility Series data is tabulated, by **sex**, the **total number of children surviving** at the time of enumeration plus the number of **total children ever-born**, classified by the age of the mother
- This series also provides the age of the women at last birth
- Census C series data was used for other socioeconomic variables
- All states does not have SC and ST population
SC population is not available - Arunachal Pradesh, Nagaland, Lakshadweep, and the Andaman and Nicobar Islands
ST population is not available - Punjab, Chandigarh, Haryana, Delhi, and Puducherry.

Data and Methods

Measures

The under-five mortality rate at district level, defined as the probability of dying before the fifth birthday, is used as a **dependent variable**

District level independent variables-

✓ Disability rate by sex

Percentages of the following:

- ✓ SC population
- ✓ ST population
- ✓ female literacy
- ✓ urban population
- ✓ main workers (those workers who had worked for the major part of the reference period 6 months or more)
- ✓ households with safe drinking water
- ✓ households with no latrine facility on the premises
- ✓ households without electricity
- ✓ households with two or more living rooms and
- ✓ use of clean fuel for household cooking

Data and Methods

Methods

Demographic analysis

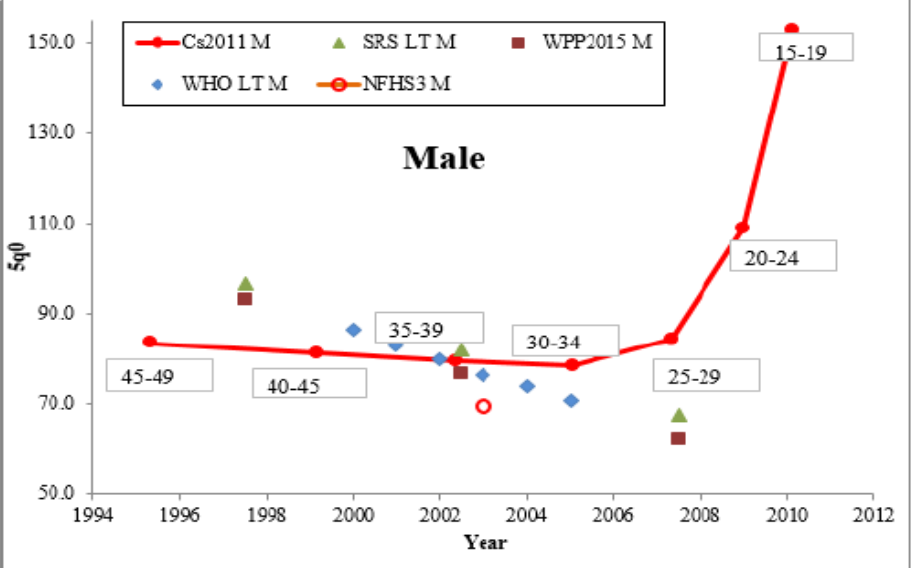
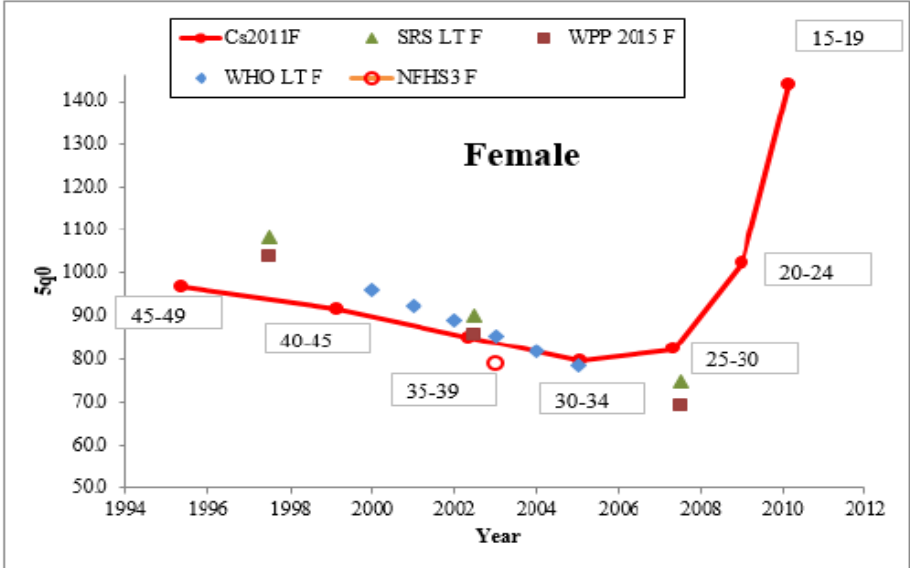
- ✓ We used summary birth history method propounded by Brass (Brass & Coale, 1977) to estimate the U5MR
- ✓ To apply this method, we first calculated the proportion in the population of the *average number of children ever born* and the *average number of children surviving* to the age of five, as reported by women and classified by age-group. The *mean age of the age-specific fertility schedule* was calculated using information on women's age at their last birth.
- ✓ Used South Asian model life table
- ✓ Census figures for some isolated districts were identified as outliers. They were identified by a set of criteria namely, size of maternal sample, range of under-five mortality rate, sex ratio of ever-born children, and spatial dependence.
- ✓ We use estimates obtained from the women 35–39 age-group based upon consistency analysis

Statistical analysis

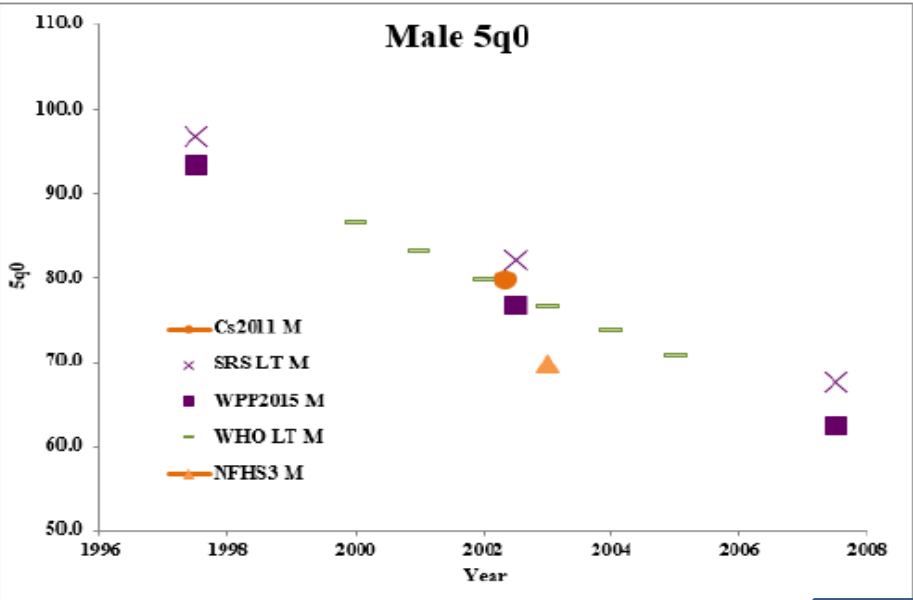
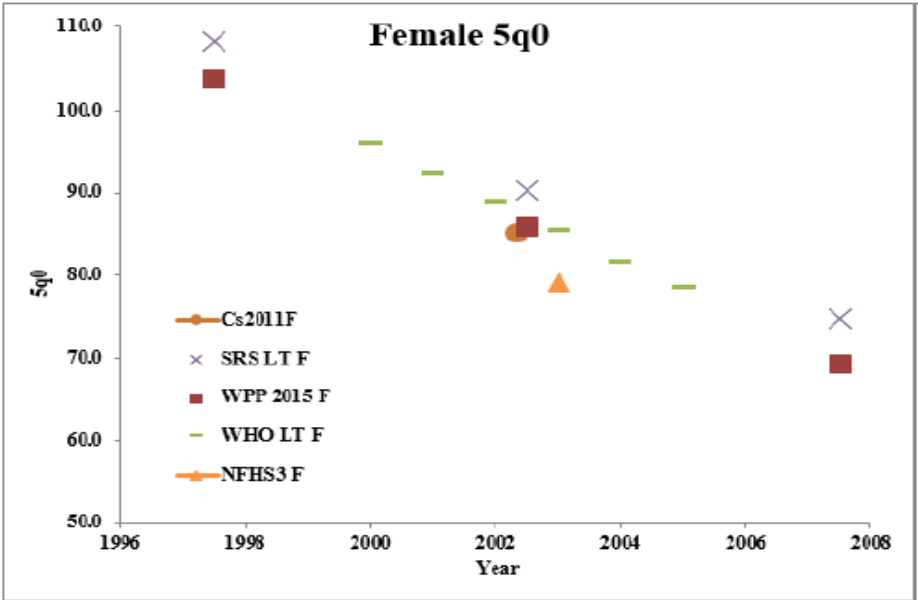
- ✓ Descriptive analysis and multiple regression analysis



Comparison of U5MR from Census based on information of women from various cohorts and other sources, India



Comparison of U5MR from Census based on information women aged 35-39 and other sources, India



Results

Table 1 Descriptive statistics of the dependent variables used in the study at district level, India

Variables	N	Mean	Std. Dev.	Min	Max	C.V
Female U5MR for overall	640	85.2	27.6	23.2	201.8	0.324
Male U5MR for overall	640	81.9	25.3	25.4	203.5	0.309
Female U5MR for non-SC/ST	640	79.0	25.2	12.9	178.7	0.319
Male U5MR for non-SC/ST	640	76.2	22.5	18.5	203.1	0.295
Female U5MR for SC	581	93.0	32.3	11.1	255.2	0.348
Male U5MR for SC	581	88.0	26.2	18.0	206.0	0.298
Female U5MR for ST	560	93.0	36.9	14.6	215.1	0.397
Male U5MR for ST	560	92.4	34.9	18.0	206.3	0.378

Table 2 Descriptive statistics of the used independent variables at district level, India

Determinants	N	Mean	Std. Dev.	Min	Max	C.V
Female disability rate	640	2.0	0.5	0.8	4.5	0.279
Male disability rate	640	2.3	0.6	0.7	4.8	0.259
Percent SC	600	15.8	8.6	0.1	50.2	0.540
Percent ST	548	20.7	28.1	0.1	98.6	1.358
Percent female literacy	640	55.2	12.4	24.2	88.6	0.225
Percent of urban population	637	26.5	21.1	1.3	100.0	0.795
Percent of main workers*	640	73.3	12.6	30.6	96.4	0.173
Percent of HH with safe drinking water	640	70.7	20.0	8.6	99.6	0.282
Percent of HH with no latrine facility on the premises	640	53.6	26.3	1.0	94.0	0.491
Percent of HH without electricity	640	34.1	28.3	0.3	98.1	0.830
Percent of HH having 2 or more living rooms	640	62.7	15.5	12.0	96.0	0.246
Percent of HH using clean fuel for cooking	640	25.5	20.1	1.0	92.0	0.786

Note: HH=household

*Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are termed as Main Workers

Figure 1 U5MR comparison across states for non- SC/ST, overall, SC, and ST population, India, ca. 2003

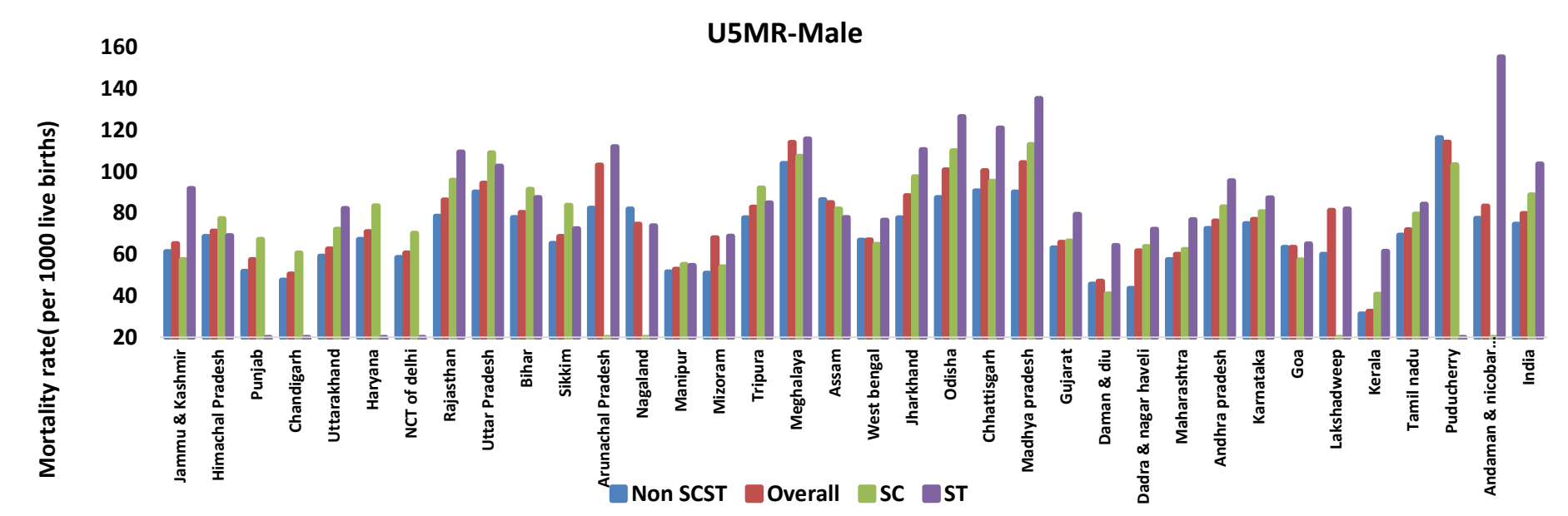
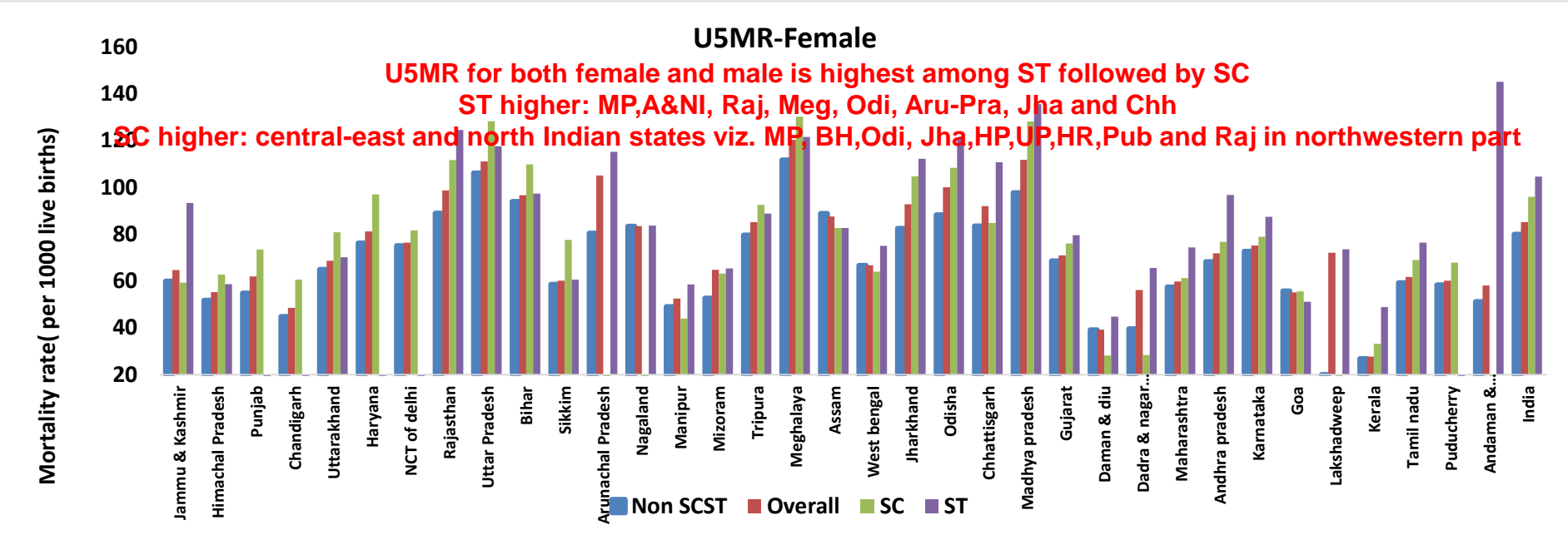


Figure 2 U5MR rate for female and male child for overall, non-SCST population, India, ca. 2003

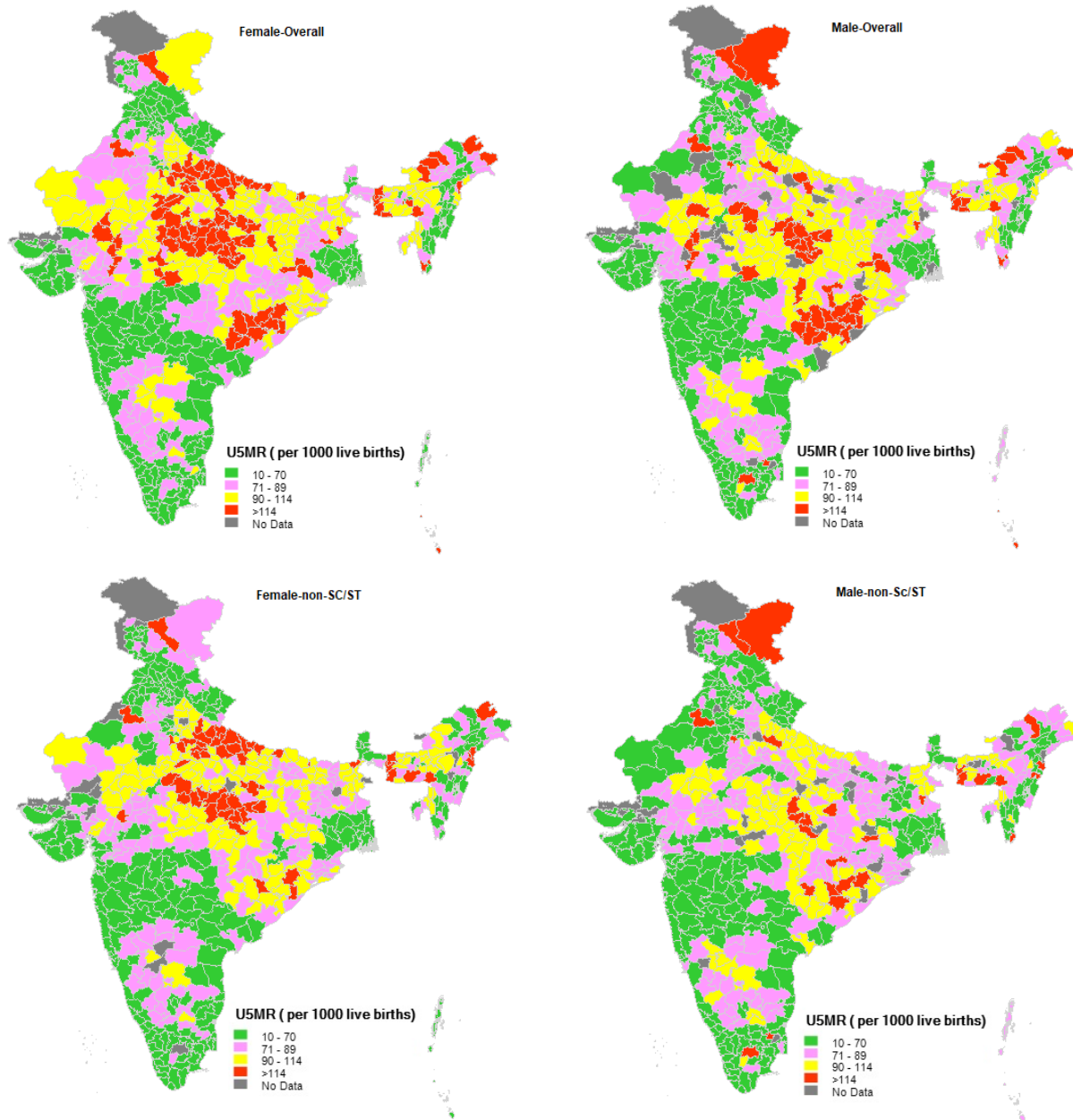
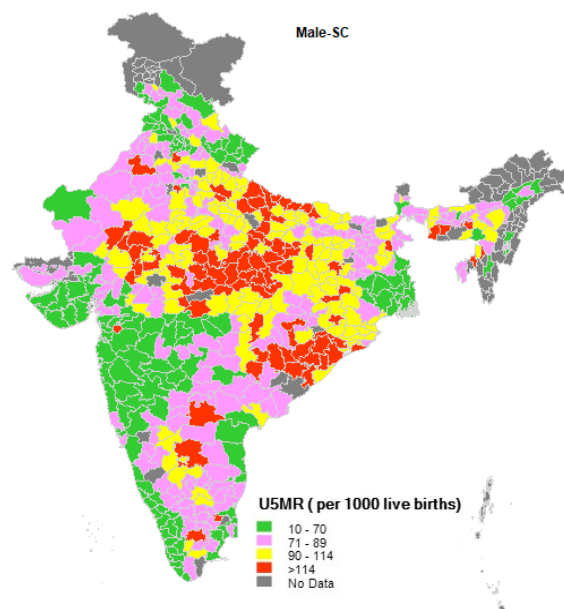
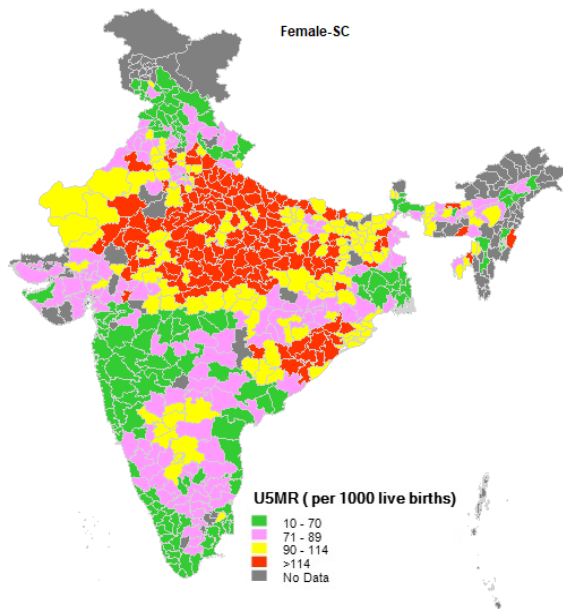


Figure 3 U5MR rate for female and male child SC, and ST population, India, ca. 2003

90–114 :
Districts from-
Bih, MP,
Odi, Raj,
Kar, and
UP



>114 :
Districts from-
AP,Meg,
Nag,Bih,
Chh, Har,
J&K,MP,
Odi, Jha,
Raj, Pub,
A&NI and
UP

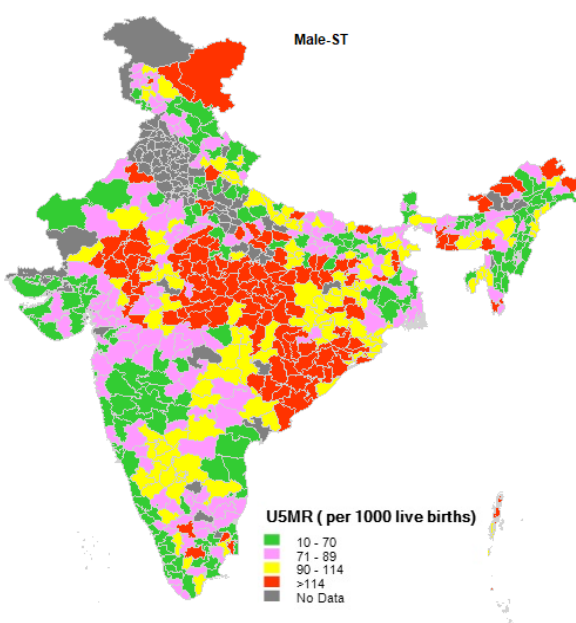
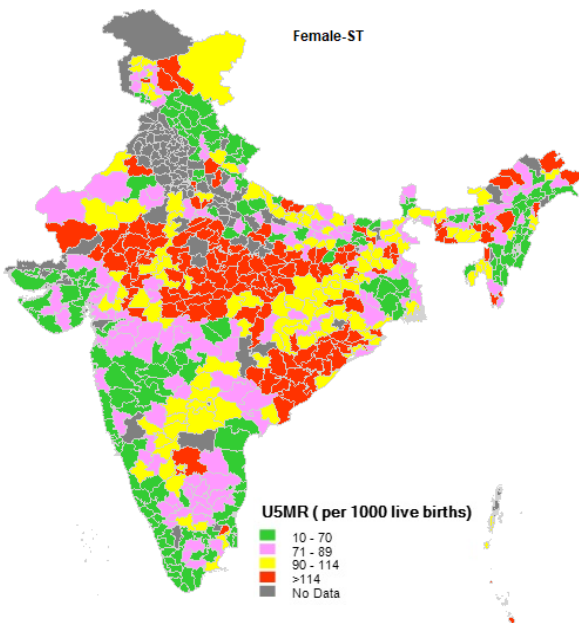


Table 3 Regression output of U5MR and district-level determinants, India, ca. 2003

Determinants	Overall		Non-SC/ST		SC		ST	
	Female	Male	Female	Male	Female	Male	Female	Male
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Unadjusted Models								
Percent SC	0.89*** (0.16)	0.91***	0.64***	0.66***	1.14***	1.14***	1.34***	1.31***
Percent ST	0.48*** (0.06)						0.22) 0.57***	(0.21) 0.60***
Constant	63.13*** (3.19)						0.08) 0.77***	62.97*** (4.12)
Observations	508						505	505
R-squared	0.13						0.11	0.13
Adjusted Models[#]								
Percent SC	0.34*** (0.12)	0.40*** (0.14)	0.08 (0.12)	0.19 (0.13)	0.64*** (0.18)	0.64*** (0.16)	0.84*** (0.20)	0.76*** (0.21)
Percent ST	0.29*** (0.04)	0.38*** (0.05)	0.07* (0.04)	0.17*** (0.05)	0.16** (0.07)	0.24*** (0.06)	0.33*** (0.07)	0.39*** (0.07)
Constant	72.96*** (13.28)	83.31*** (14.52)	70.01*** (13.28)	83.83*** (14.52)	66.18*** (13.28)	70.40*** (14.52)	79.04*** (13.28)	70.90*** (14.52)
Observations	508	508	508	508	508	508	508	508
R-squared	0.62	0.47	0.62	0.47	0.62	0.47	0.62	0.47

Overall, the U5MR in districts rises significantly with an increasing percentage of the population being ST/SC. In all unadjusted models, it was found that, at the district level, as the percentage of SC/ST population increases, the U5MR also increases significantly

In the adjusted models, it was observed that presence of the SC/ST population in a district significantly affects the overall and SC/ST mortality rate

Note: (a)*** p<0.01, ** p<0.05, * p<0.1, (b) Standard independent variables presented in Table 2. #Details

Table 4 Adjusted regression output of U5MR and district-level determinants, India, ca. 2003

Determinants	Overall		Non-SC/ST		SC		ST	
	Female	Male	Female	Male	Female	Male	Female	Male
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Female disability-prevalence rate	2.01		1.64		4.16*		6.14***	
	(1.43)		(1.37)		(2.17)		(2.34)	
Male disability-prevalence rate		2.52*		1.51		5.40***		7.48***
		(1.45)		(1.43)		(1.73)		(2.23)
Percent ST	0.29***	0.38***	0.07*	0.17***	0.16**	0.24***	0.33***	0.39***
	(0.04)	(0.05)	(0.04)	(0.05)	(0.07)	(0.06)	(0.07)	(0.07)
Percent SC	0.34***	0.40***	0.08	0.19	0.64***	0.64***	0.84***	0.76***
	(0.12)	(0.14)	(0.12)	(0.13)	(0.18)	(0.16)	(0.20)	(0.21)
Percent female Literacy	-0.85***	-0.51***	-0.70***	-0.37***	-0.79***	-0.30**	-0.79***	-0.19
	(0.10)	(0.11)	(0.10)	(0.11)	(0.16)	(0.14)	(0.17)	(0.17)
Percent of urban Population	0.26***	0.08	0.14**	0.01	0.32***	0.14	0.56***	0.29**
	(0.07)	(0.08)	(0.07)	(0.08)	(0.11)	(0.09)	(0.12)	(0.12)
Percent of main Workers	0.27***	0.04	0.30***	0.04	0.35**	0.05	0.14	-0.11
	(0.09)	(0.10)	(0.09)	(0.10)	(0.14)	(0.12)	(0.15)	(0.15)
Percent of HH with safe drinking water	0.12**	0.07	0.14***	0.04	0.09	-0.01	-0.01	-0.02
	(0.05)	(0.06)	(0.05)	(0.05)	(0.08)	(0.06)	(0.08)	(0.09)
Percent of HH without latrine facility on the premises	0.12**	0.16***	0.08	0.14**	0.04	0.16**	0.31***	0.41***
	(0.06)	(0.06)	(0.05)	(0.06)	(0.08)	(0.07)	(0.09)	(0.09)
Percent of HH without electricity	0.32***	0.11*	0.31***	0.12**	0.49***	0.27***	0.18**	-0.02
	(0.05)	(0.06)	(0.05)	(0.06)	(0.08)	(0.07)	(0.09)	(0.09)
Percent of HH having 2 or more dwelling room	-0.04	-0.13**	-0.06	-0.15**	0.05	-0.08	0.11	0.04
	(0.06)	(0.06)	(0.06)	(0.06)	(0.08)	(0.07)	(0.10)	(0.10)
Percent of HH using clean fuel for cooking	-0.34***	-0.15	-0.30***	-0.10	-0.53***	-0.25*	-0.56***	-0.36**
	(0.10)	(0.11)	(0.10)	(0.11)	(0.15)	(0.13)	(0.17)	(0.17)
Constant	72.96***	83.31***	70.01***	83.83***	66.18***	70.40***	79.04***	70.90***
	(13.28)	(14.52)	(12.72)	(14.27)	(20.26)	(17.38)	(21.82)	(22.34)
Observations	508	508	508	508	489	490	505	505
R-squared	0.62	0.47	0.56	0.35	0.46	0.39	0.43	0.34

Note: (a) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, (b) Standard errors are presented in parentheses (c) HH=household

Discussion & Conclusion

- ✓ **The present study examined the disparity in the U5MR between non-deprived and deprived caste groups in India at small administrative units (districts)**
- ✓ **As the civil registration system in India is incomplete, the U5MR by caste is still not available for Indian districts. Big demographic and health surveys such as National Family Health Survey (including the most recent round conducted in 2015–2016) or Sample Registration System also cannot provide U5MR at district level because of insufficient sample size**
- ✓ **In such circumstances, the application of indirect demographic techniques to census data is the only way of assessing the U5MR at the district level**
- ✓ **It was observed that the burden of under-five mortality is disproportionately concentrated among the deprived-caste or SC/ST population and in certain disadvantaged regions and districts**

Discussion & Conclusion

- ✓ The highest levels of U5M were found in the far *north, northeast, and central part* of the country. Lower levels of U5M were seen in the *south, west*, and some parts of the *north-east and center-north* of the country
- ✓ Within India, Arunachal Pradesh, Bihar, Chhattisgarh, Haryana, Jammu and Kashmir, Madhya Pradesh, Nagaland, Odisha, Punjab, Rajasthan, and Uttar Pradesh have *unusually high levels of U5M among the SC/ST population* compared with other states
- ✓ Across all caste groups, the female under-five mortality rate is higher in the study period; this indicates the presence of discriminatory behavior toward girl children
- ✓ One of the most important inferences of the present study is that the proportion of the population belonging to deprived castes is a contextual determinant of higher U5M in Indian districts

Discussion & Conclusion

- ✓ From this results, it appears that maternal and child healthcare programmes, such as the Child Survival and Safe Motherhood Programme (CSSMP) and the National Maternity Benefit Scheme, have not yet fully reached the most vulnerable sections of society in Indian districts
- ✓ This study has some limitations. First, the estimates approximately correspond to the 2003 period. Yet, in the absence of a big enough sample size in large demographic and health surveys, these are the most recent estimates for district level U5M by caste. Secondly, the results of the statistical model cannot be seen as causal because of the cross-sectional nature of the dataset
- ✓ The findings of this study are relevant for the design of public-health policies and programs in Indian districts
- ✓ Government should take special measures to address the higher U5MR districts mentioned in this study and focus on improving the socioeconomic conditions of the deprived castes

***Thank you
for your attention***

Feel free to contact: jkbnwg@gmail.com