RESEARCH PAPER

Diversity in Child Mortality and Life Expectancy at Birth Among Major Tribes in Selected States of India

ARVIND VERMA[1], RAVENDRA K SHARMA[2] AND KALYAN B SAHA[1]

From [1]Indian Council of Medical Research (ICMR) – National Institute of Research in Tribal Health, Jabalpur, Madhya Pradesh; [2]ICMR-National Institute of Medical Statistics, New Delhi; India.

Correspondence to: Dr Arvind Verma, Principal Technical Officer, ICMR-National Institute of Research in Tribal Health, PO-Garha, Nagpur Road, Jabalpur 482 003, Madhya Pradesh, India. vermaarvind1@rediffmail.com
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Objective: To provide tribe- specific child mortality rates and health indicators from selected states in India. **Methods**: We used Census 2011 data and Coale Demney methodology to estimate the infant mortality rate (IMR), under-five mortality rate (U5MR) and expectation of life at birth (LEB) for 123 tribes of selected states of India. **Results**: The estimated IMR and U5MR were higher in scheduled tribe population compared to respective state's total population. The IMR varied from 124 in the Birhore tribe of Chhattisgarh and Jharkhand, and the Bharias of Madhya Pradesh to 48 per 1000 live births in the Gamit tribe of Maharashtra. Similarly, the U5MR varied from the highest (203) in the Birhore tribe of Chhattisgarh to the lowest (57/1000 live births) in the Gamit tribe. The LEB varied from 72 years in the Gamit tribe of Maharashtra to 51 years in the Birhore tribe of Chhattisgarh. The study reveals that tribes have gross variation in child mortality rates and there is pressing need to prioritize tribe-specific action plans to improve their health indicators.

Key words: *Health, Indigenous population, Infant mortality, Neonatal care, Under-5 mortality rate.*

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India has 705 Scheduled Tribal groups (ST) with a population of 104 million (8.6% of total population) as per 2011 census. These tribal groups constitute the second largest tribal population in the world, after the African continent. These tribal groups belong to different ethnic groups and are at different levels of development. The tribal population contributes considerably to infant and under five deaths. As per recent NFHS-4 survey in 2015-16, infant mortality rate (IMR) and under -five mortality rate (U5MR) were 44 and 57 among the ST population compared to national average of 32 and 38, respectively [1]. Poorer health and social outcomes for indigenous peoples than for non-indigenous populations have been reported from across the world [2].

The Indian population census in 2011 enumerated ST population in 30 states and union territories of the country. ST population residing in Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and Rajasthan states accounts for two-third of the tribal population of rural India [3], and are in a critical state and consistently reporting poor vital parameters which varied in tribal sub-groups [4]. The mortality rates for STs of these states are much higher compared to tribes residing in the other states [1]. However, no data is available on tribe-specific child mortality and life expectancy in India. Hence, in the present analysis, we estimated the IMR, U5MR and life expectancy at birth (LEB) for major tribes residing in Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and Rajasthan states of India.

Editorial Commentary: Pages 11-12.

METHODS

The census, 2011 of India enlisted 705 tribes/tribal groups in the country and out of them 75 tribes/tribal groups/ sub-groups were classified as particularly vulnerable tribal groups (PVTG), formerly known as primitive tribes [3]. Of these, 268 tribes, including 38 PVTGs, reside in the selected seven states. However, only 106 tribes/ tribal groups, each having at least 5,000 women, and 17 PVTGs, each having at least 1,000 women in the age group (15-49), are included in the study, so as to have relatively robust estimates. Overall, these selected tribes encompassed about 94-97% of the respective state's total ST population. The data on Children Ever Born (CEB) and Children Surviving (CS) are used for the estimation of IMR, U5MR and life expectancy at birth LEB, and compiled from tribes-specific tables of census, 2011 [5].

We used the Brass method for estimating the child mortality rates. The Brass method estimates the mortality q(x)-the probability of dying between birth and exact age x, from the proportion of children dead among those ever born by women in different age groups [8]. Trussell [8] version of Brass method which uses Coale Demeny south model life tables to simulate mortality was adopted to estimate the child mortality. The estimates of IMR, U5MR and LEB are calculated by MORTPAK 4.3 software (United Nation) [7]. The MORTPAK provides age group specific estimates of IMR, U5MR and LEB. The weighted average of estimates for women age groups 20-34 years are considered using CEB as weights and refer to 4.6 years prior to census reference date, i.e. 2006-07 year. The estimates of IMR, U5MR, and LEB were calculated for Indian total population and total ST Population, selected seven states' total population and total ST population, and 123 selected major tribes residing in these states.

RESULTS

The IMR, U5MR, and LEB estimates are summarized in **Fig. I** and **Table I**. The tribe specific estimates of IMR, U5MR and LEB for all 123 tribes are given in **Web Annexure I**.

The estimated IMR for India's total population was 65 compared to 76 per 1000 live births for country's total scheduled tribe (ST) population in year 2006-07. The IMR for total population varied from lowest (53) in Maharashtra to highest (76) in Madhya Pradesh, whereas in case of total ST population it varied from lowest (60) in Maharashtra to highest (89) in Madhya Pradesh. Overall, ST population in Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha and Rajasthan states had 11-14 extra infant deaths per 1000 live births compared to respective state's averages. In the studied 123 tribes, 66 tribes had higher IMR than the national ST average (76 per 1000 live births). The mean (SD) of estimated IMR for 123 tribes/tribal groups was 80.9 (19.7) per thousand live births, ranging from highest 124 in the Birhore tribe of Chhattisgarh and Jharkhand states, and the Bharia tribe of Madhya Pradesh to lowest 48 in the Gamit tribe of Maharashtra, depicting that on an average 76 extra infants died during first year of life in the Birhors and the Bharia tribes compared to the Gamits of Maharashtra. The difference in IMR was not only observed between tribes residing in different states but also among tribes residing within the states. A difference of 49-62 extra infant deaths was observed among the tribes of Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha, and Rajasthan states (**Table I**).

The U5MR for India as a whole was estimated at 82 deaths per 1000 live births, whereas it was 101 for total scheduled tribe (ST) of the country i.e., on an average 19 extra deaths among children under five years in ST population compared to the national average. The U5MR for total population varied from lowest (64) in Maharashtra to highest (100) in Madhya Pradesh. However, in case of total ST population U5MR varied from lowest (76) in Maharashtra to highest (123) in Madhya Pradesh. Overall, ST population in Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha and Rajasthan states had 21-24 extra deaths per 1000 children under five years age compared to respective state averages (**Fig.1**). Among 123 tribes, 65 tribes had higher U5MR than the national average for ST population (101). The mean (SD) U5MR was 112.0 (36.5) per thousand live births ranging from highest (203) in the Birhore tribe of Chhattisgarh to the lowest (57) in the Gamit tribe of Maharashtra, reflecting 146 extra under five deaths in the Birhore compared to the Gamit tribe (**Table I**).

The estimated LEB for total population and total ST population of India was 67 and 65 years, respectively. This shows that on an average, a tribal individual survives two years lesser than the national average. Among the selected seven states, the LEB for total population varied from 65 years in Madhya Pradesh to 70 years in Maharashtra state. However, in case of total scheduled tribe population, the LEB varied from 61 years in Madhya Pradesh to 69 years in Maharashtra (**Fig. 1**). Among 123 selected tribes, 70 tribes had lower LEB than the national average for ST population (65 years).The mean (SD) of estimated LEB for 123 tribes was 63.0 (5.3) years, ranging from highest 72 years in the Gamit tribe of Maharashtra to lowest 51 years in the Birhore tribe of Chhattisgarh. The difference in LEB was not only very high between the tribes residing in different states, but also among tribes residing within the state. In Chhattisgarh state, the LEB varied from 51 years in the Birhore tribe to 68 years in the Oraon tribe. A difference of 13-17 years was observed in tribes of Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha, and Rajasthan (**Table I**).

DISCUSSION

Vast difference was noted to prevail in child mortality by tribal groups. The IMR and U5MR was 44.4 and 57.7, respectively among STs compared to national averages of 40.7 and 49.7, respectively. These child mortality rates also vary considerably among ST population of different Indian states. However, there is dearth of information on different tribal communities, especially on demographic and health indicators. The expert group on tribal health, Government of India [8] and Saha, et al. [9] highlighted the

Table I Tribe-Specific Estimates of Infant Mortality Rate (IMR), Under-5 Mortality Rate (U5MR) and Life Expectancy at Birth in the States

State (Total tribes)[a]	*Total studied tribes*[b]	*IMR (per 1000 live births)*			*U5MR (per 100 live births)*			*Life expectancy at birth (y)*		
		Highest	*Lowest*	*Total*[c]	*Highest*	*Lowest*	*Total*[c]	*Highest*	*Lowest*	*Total*[c]
Chhattisgarh (42)	20	124.3 (Birhore)	62.0 (Oraon)	84	203.0 (Birhore)	80.3 (Oraon)	118	67.8 (Oraon)	51.2 (Birhore)	62
Madhya Pradesh (46)	14	123.8 (Bharia)	68.5 (Majhi)	89	194.8 (Bharia)	88.8 (Majhi)	123	66.4 (Majhi)	52.1 (Bharia)	61
Jharkhand (30)	22	124.3 (Birhore)	67.0 (Karmali)	81	195.8 (Birhore)	86.0 (Karmali)	109	66.8 (Karmali)	52.0 (Birhore)	63
Odisha (62)	24	112.6 (Koya)	58.5 (Bathudi)	87	171.4 (Koya)	72.9 (Bathudi)	120	68.9 (Bathudi, Sounti)	54.9 (Koya)	62
Rajasthan (12)	7	118.5 (Saharia)	69.8 (Dhanka)	83	183.5 (Saharia)	90.4 (Dhanka)	113	66.1(Dhanka)	53.4 (Saharia)	63
Gujarat (29)	19	76.3 (Dhanka)	49.5 (Rabri)	67	101.5 (Dhanka)	60.2 (Rabri)	86	71.3 (Rabri)	64.4 (Dhanka)	67
Maharashtra (47)	17	75.0 (Pradhan)	47.5 (Gamit)	60	99.4 (Pradhan)	57.2 (Gamit)	76	71.8 (Gamit)	64.7 (Pradhan)	69

[a]Total number of tribes/tribal groups enumerated in the state in census 2011; [b]Total number of tribes for which tribe-specific estimates computed; [c]Estimates for total scheduled tribe population of the state.

need to generate tribe-specific data to formulate developmental programs accordingly.

Our estimate of IMR for total ST population of the country is slightly higher as compared to previous reports [2], which estimate 74.3 deaths per 1000 live births. The difference between two rates of IMR based on census 2011 data is due to different methodologies adopted. Anderson, et al. [2] have used Coale-Demeny model (Palloni Heligman equation) with South Asian life-table and taken simple average of estimates for age groups 20-34 years. Whereas, we have used Coale-Demeny model (Trussell equation) with South Asian life-table and taken weighted average of estimates for age groups 20-34 years. The study has not only demonstrated the huge differences in child mortality and life expectancy at birth among tribes residing in different states, but also among tribes residing within the state. The tribes residing in economically backward states like Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha and Rajasthan were having higher child mortality indicators compared to those residing in relatively well-off states of Gujarat and Maharashtra. The study also shows that most of the PVTGs residing in different states have relatively higher mortality rates and lower life expectancy compared to other tribal communities residing within the states. A gap of 76 in IMR and 146 in U5MR among tribal communities is a matter of serious concern and needs immediate attention. Similarly, a variance of 21 years in life expectancy at birth reflects an extremely poor health status among some tribal communities.

The child mortality rates may be higher among tribal communities because of their poor socio-economic status, geographical isolation, poor availability and inaccessibility, and underutilization of modern health services. Sahu, et al. [10] recorded high IMR and U5MR among scheduled tribes of rural India and reported that the factors associated with mortality remained more or less same over the period of 1992-2006. The NFHS-4 shows that one-third pregnant women from ST community in India did not receive any antenatal care during pregnancy and majority of the deliveries (73.2%) are performed with assistance of midwife at home; lack of proper training and low frequency of postnatal check-ups (68.6%) pose serious threat to the health of newborns [4]. Inequalities in the proximate determinants of child mortality, which vary according to their beliefs and multiplicity of cultures, and in turn influences antenatal care, delivery practices and postnatal care of infants [11]. Culture, ritual and traditional beliefs of the tribes also acts as hindrance in utilization of maternal and child health (MCH) facilities [4]. Many tribal communities still believe in various taboos and traditional practices.

WHAT THIS STUDY ADDS?

- We provide tribe-specific estimates of infant mortality rate, under-five mortality rate and life expectancy at birth for 123 tribes of seven states of India.

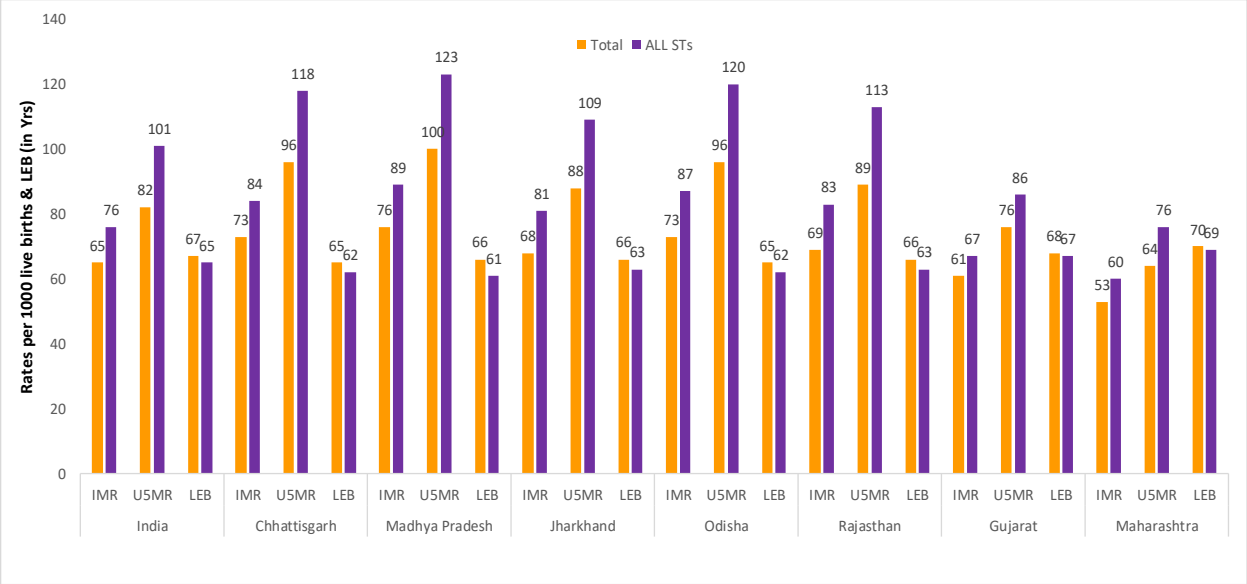

Fig. 1 Estimated infant mortality rate (IMR), under-5 mortality rate (U5MR), life expectancy at birth (LEB) for total and scheduled tribes population of India and selected states.

Delayed breastfeeding and pre-lacteal, supplementary feeding practices like honey and goat's milk are also widespread among them [12,13]. The presence of malnutrition, anemia, higher incidence of infectious diseases like malaria, tuberculosis and diarrheal diseases may further worsen the child mortality in these tribal communities.

These estimates are derived from census 2011 data using Trussell version of Brass method, which has its own limitations, as it assumes that age-specific fertility and mortality rates remained constant in the recent past, and no strong relation exists between the age of mother and infant mortality, etc., and these estimates are referred for the year 2006-07. In the absence of any other tribe- specific data source, these estimates will provide valuable information which may guide the program managers.

In India, tribes are classified as scheduled tribes and clubbed together for implementation of socio-development program for their upliftment. However, tribes are not a homogenous group and enormous variation is observed in the estimates of IMR, U5MR and LEB. Hence there is a need for tribe-specific approach to bridge the gap. The present study also affirms the need to generate tribe-specific data, prioritize the tribal group on the basis of their vulnerability, health and mortality parameters. Accordingly, tribe-specific developmental programs may be formulated to improve the childhood health and quality of life so that country can achieve SDGs targets within the stipulated time frame.

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