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Clinical Profile and Determinants of Infant Deaths in a Tribal District Hospital in India

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Abstract:

Tribal populations in India experience disproportionately high infant mortality rates due to a combination of socioeconomic disadvantages, limited access to healthcare, and traditional practices. Understanding the specific determinants of infant mortality in these communities is essential for developing targeted interventions. India has made significant strides in reducing both infant mortality (40/1000 live births) and under-five mortality (52/1000 live births) but has been unable to achieve the Millennium Development Goal (MDG) by 2015. So, this study aimed to assess the causes of death in infants admitted to a tertiary care hospital in the tribal region. A Cross-Sectional study is conducted at tertiary care Hospital, focusing on studies that analyse infant mortality in tribal regions of India. The data of infant's death taken from MRD section during period Sept 24 to Nov 24. Data entered and analysed by epi-info

Software version 7.2.6.0. Among 112 infants' death, 62(55.36%) are male and 50(44.64%) are female. Death was found more in rural area 96(85.71%) compared to urban area 16(14.29%). This study clearly show that higher (53.57%) death reported in Respiratory Distress which include Birth Asphyxia, Respiratory Distress Syndrome, Cardiac Respiratory Arrest, Meconium Aspiration Syndrome. And Congenital 18.75%, Infection 16.96%, malnutrition 1.79%, Necrotising enterocolitis 7.14%, Pneumonia 1.79% are reported. Significant association was found between Age group and low birth weight ($p = 0.001$). Deaths in neonates (first 28 days) are more common in children's born with low birth weight. So, to reduce mortality more care is needed in infants with low birth weight.

Keywords: Infant mortality, Neonatal, Respiratory Distress, Birth Asphyxia, tribal region, India

Introduction:

Tribal populations in India experience disproportionately high infant mortality rates due to a combination of socioeconomic disadvantages, limited access to healthcare, and traditional practices. Understanding the specific determinants of infant mortality in these communities is essential for developing targeted interventions. Preterm birth and related complications are the major determinants of neonatal morbidity and childhood disability¹⁶. Infant mortality is the most sensitive indicator of population health. High infant mortality rate (IMR) reflects the presence of unfavourable social, economic, and environmental conditions during the 1st year of life²¹. Under-five children constitute 20% of India's population, which makes every unit change in mortality to reflect great effect in the population.⁸

There were an estimated 4 million neonatal deaths for the year 2000⁶ and recent estimates indicate that in 2009 an estimated 3.3 million babies died in the first month of life- a reduction from an estimated 4.6 million neonatal deaths in 1990¹⁰. More than half of all neonatal deaths occurred in 5 countries (44% of global live births): 27.8% in India (19.6%), 7.2% in Nigeria (4.5%), 6.9% in Pakistan (4.0%), 6.4% in China (13.4%), and 4.6% in Democratic Republic of the Congo (2.1%)¹⁰. Between 1990 and 2009, the global neonatal mortality rate (NMR)

declined by 28%, from 33.2 deaths per 1000 live births to 23.9 deaths per 1000 live births¹⁰. The proportion of child deaths in the neonatal period increased in all regions of the world, and globally it is now 41%. While NMRs were halved in some regions, Africa's NMR only reduced by 17.6% (from 43.6% to 35.9%). Of these mortalities, maternal health complications contribute to 1.5 million neonatal deaths during the first week of life and 1.4 million stillborn babies⁵. There has been increasing awareness over recent years of the persisting burden of worldwide maternal, newborn, and child mortality. Although estimates differ, approximately 300000 women die each year globally, while over 15 million suffer long-term illness or disability due to complications of pregnancy and childbirth^{4,7,22}.

In India, different national programs were introduced to restrain neonatal as well as infant mortality such as Integrated Management of Neonatal and Childhood Illness, Janani Shishu Suraksha Karyakram, and Rastriya Bal Suraksha Karyakram. Still, inadequate maternal and newborn care, lack of quality care, overdependence on higher health-care centers, and overlooked adolescence are few of factors that compelled the Government of India to adopt the concept of continuum of care recently, as emphasized in Reproductive, Maternal, Newborn, Child and Adolescent Health + A strategy²⁰.

India has made significant strides in reducing both infant mortality (40/1000 live births) and under-five mortality (52/1000 live births) but has been unable to achieve the Millennium Development Goal (MDG) by 2015. So, this study aims to assess the causes of death in infants admitted to a tertiary care hospital in the tribal region.

Methodology:

A Cross-Sectional Study is conducted at tertiary care Hospital, focusing on studies that analyse infant mortality in tribal regions of India. The data of infant's death taken from MRD section during period Sept 24 to Nov 24. The Data was collected and entered in Microsoft excel along with coding was done and analysed by epi-info Software version 7.2.6.0. The descriptive data was express in terms of frequencies and percentage. Continuous variables were described in terms of mean and SD. Chi square test was applied to observe the differences between proportions p -value less than 0.05 was considered significant.

Results:

A total of 112 infant deaths were recorded in the study. Of these, 62 (55.36%) were male and 50 (44.64%) were female, indicating a slightly higher proportion of male infant mortality.

Table 1: Distribution of study participants (N = 112)

Sr. No.	Variables		Frequency	Percentage
1	Gender	Male	62	55.36%
		Female	50	44.64%
2	Age Group	Early Neonatal	63	56.25%
		Late Neonatal	28	25.00%
		Infants	21	18.75%
3	Area	Rural	96	85.71%
		Urban	16	14.29%
4	Diagnosis	Congenital	21	18.75%
		Infection	19	16.96%
		Malnutrition	2	1.79%
		Necrotising Enterocolitis	8	7.14%
		Pneumonia	2	1.79%
		Respiratory	60	53.57%

As shown in Table 1, the majority of deaths occurred during the early neonatal period (0-7 days), accounting for 56.25% ($n = 63$) of cases. Late neonatal deaths (8-28 days) constituted 25.00% ($n = 28$), while post-neonatal deaths (29 days to 1 year) accounted for 18.75% ($n = 21$). Geographically, the burden of infant mortality was significantly higher in rural areas (85.71%, $n = 96$) compared to urban areas (14.29%, $n = 16$). With regard to the causes of death, respiratory conditions were the most common, contributing to 53.57% ($n = 60$) of cases. Other causes included congenital anomalies (18.75%, $n = 21$), infections (16.96%, $n = 19$), necrotising enterocolitis (7.14%, $n = 8$), malnutrition (1.79%, $n = 2$), and pneumonia (1.79%, $n = 2$).

Fig. 1: Prevalence of Low Birth Weight

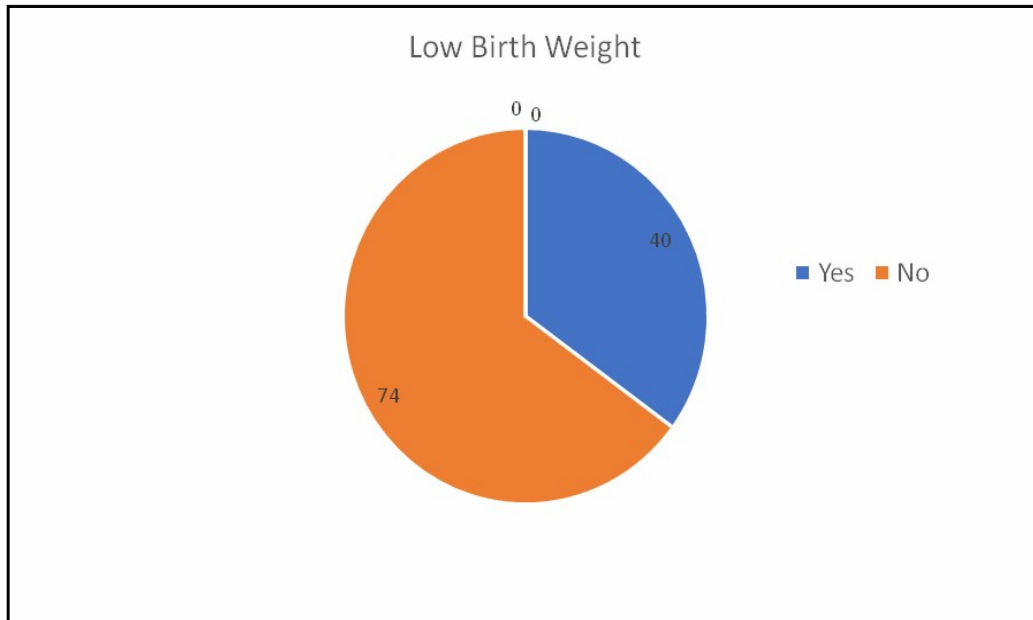


Fig. 2: Prevalence of Prematurity

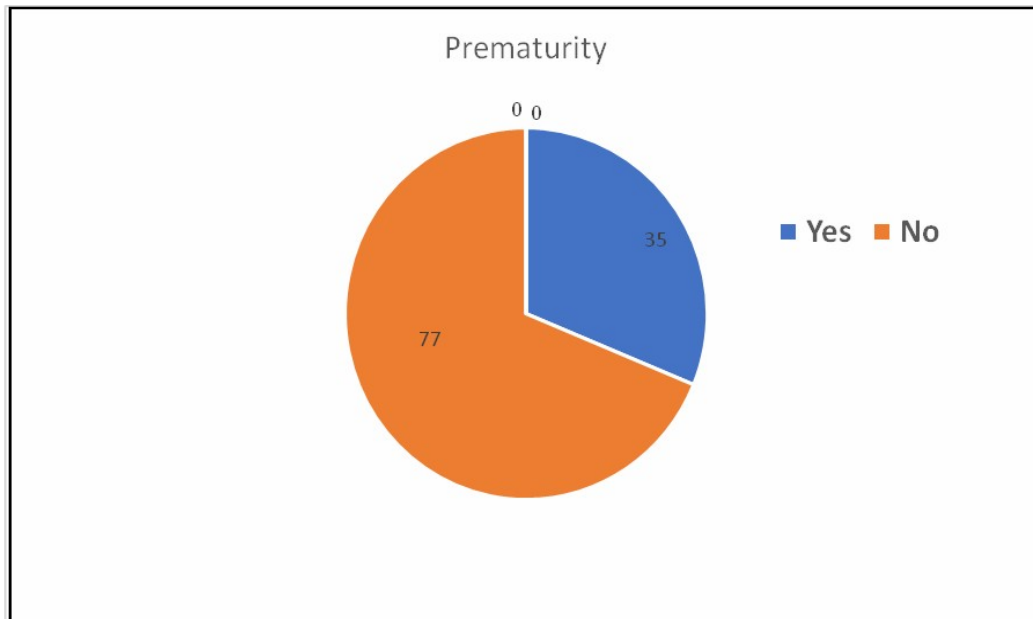


Table 2: Association of Low Birth weight with study variables

Sr. No.	Variables		Low Birth Weight		P-value
			Yes (72)	No (40)	
1	Age	< 28 Days	65	26	0.001
		28 Days to 1 Year	7	14	
2	Gender	Male	39	23	0.733
		Female	33	17	
3	Area	Rural	60	36	0.33
		Urban	12	4	

The association of low birth weight with selected variables is summarized in Table 2. A statistically significant association was found between LBW and age group of the infant ($p = 0.001$), with a higher proportion of LBW observed among those who died within the first 28 days of life. However, no significant association was observed between LBW and gender ($p = 0.733$) or area of residence ($p = 0.33$).

Table 3: Association of Prematurity with study variables

Sr. No.	Variables		Prematurity		P-value
			Yes (35)	No (77)	
1	Age	< 28 Days	28	63	0.819
		28 Days to 1 Year	7	14	
2	Gender	Male	16	46	0.16
		Female	19	31	
3	Area	Rural	30	66	0.99
		Urban	5	11	

As shown in Table 3, the association of prematurity with age, gender, and area was not statistically significant. The p -values for age group, gender, and area were 0.819, 0.16, and 0.99, respectively.

Discussion:

In the present study, total 112 infants' death occurs at tertiary care Hospital during study period. It was observed that of Low-birth-weight 72/112(64.28%) and prematurity 35/112(31.25%) were cause of death among all infants' death at tertiary care Hospital. These findings were compared to studies, such as one by DG Basani et al were three causes accounted for 78% (0.79 M/1.01 M) of all neonatal deaths in India: prematurity & low birth weight (0.33 M deaths, 99% CI 0.31-0.35 M; mortality rate per 1000 live births [MR] = 12.0); neonatal infections, comprising pneumonia, neonatal sepsis and infections of the central nervous system (0.27 M deaths, 99% CI 0.25-0.29 M; MR=9.9); and birth asphyxia & birth trauma (0.19 M deaths, 99% CI 0.18-0.21 M; MR=7.0). Weldearegawi et al.²¹ observed that Bacterial sepsis (32.5%), prematurity (23.7%), and birth asphyxia (13.8%) were the leading causes of death during neonatal period. Shrestha S et al.¹⁶ observed that Incidence of preterm birth was 19.5%. Mean birth weight was 1670 ± 370 grams and mean gestational age was 30.02 ± 0.37 weeks. The common causes of death were hyaline membrane disease (64.5%), sepsis (58.06%) and necrotizing enterocolitis (25.8%).

In the present study showed that maximum number of infants death occurs in aged < 28 days 91/112 (81.25%) had maximum proportion of low birth weight and this association between low birth weight and deaths in aged less than 28 days was statistically significant. However, no association between gender of infants and residing areas. Weldearegawi et al.²¹ studied total 3684 infants followed, 174 of them had died before their first birthday, yielding an IMR of 47 per 1000 live births (95% CI: 41, 54). A total of 3518 infant-years of observation (IYO) were cumulated during the four years of follow-up. Thus, the incidence of infant death was 49.5 per 1000 IYO (95% CI: 42.6, 57.4). A similar study done by Shrestha S et al.¹⁶ observed that Mean birth weight was 1670 ± 370 grams and mean gestational age was 30.02 ± 0.37 weeks. The mortality rate in extremely low birth rate and very low birth rate was 80% and 39.5% respectively.

In the present study, it was observed that among all infants' deaths prematurity was also cause of infant's death. Proportions of prematurity were higher in aged < 28 days, female gender and residing rural areas, however there is no association between these study variables. A study done by Shrestha S et al.¹⁶ observed that

Incidence of preterm birth was 19.5%. Common risk factors associated with preterm birth were inadequate antenatal checkup (52%), maternal age < 20 years (34.7%), ante partum hemorrhage (23.4%) and pregnancy induced hypertension (13.1%). Common morbidities were clinical sepsis (66.7%), hyperbilirubinemia (58.8%), birth asphyxia (26.8%) and hyaline membrane disease (23.5%).

Conclusion:

Deaths in neonates (first 28 days) are more common in children's born with low birth weight. So, to reduce mortality more care is needed in infants with low birth weight.

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Conflict of Interest: No

References:

- 1) Bhatia M, Dwivedi LK, Ranjan M. et al. : Trends, patterns and predictive factors of infant and child mortality in well-performing and underperforming states of India: a secondary analysis using National Family Health Surveys. *BMJ Open* 2019; 9: e023875. doi:10.1136/bmjopen-2018-023875
- 2) Bhaumik S. : Child mortality: will India achieve the 20152. target? *BMJ* 2013; 346: f1502.
- 3) Claeson M, Bos ER, Mawji T, Pathmanathan I. : Reducing child mortality in India in the new millennium. *Bull World Health Organ.* 2000; 78: 1192-9.
- 4) Hogan M., Foreman K., Naghavi M., Ahn S.Y., Wang M., Makeela S.M. et al. : Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet.* **375** (9726): 2010; 1609-1623.
- 5) Lawn J.E., Blencowe H., Pattinson R., Cousens S., Kumar R., Ibiebele I. et al. : Stillbirths: Where? When? Why? How to make the data count? *Lancet.* **377** (9775): 2011; 1448-1463.

- 6) Lawn J.E., Cousens S., Zupan J. : 4 million neonatal deaths: When? Where? Why? *Lancet*. **365** (9462): 2005; 891-900.
- 7) Lozano R., Wang H., Foreman K.J., Rajaratnam J.K., Naghavi M., Marcus J.R. et al. : Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: an updated systematic analysis. *Lancet*. **378** (9797): 2011; 1139-1165.
- 8) National Family Health Survey (NFHS-4), India; 2015-2016. International Institute for Population Sciences (IIPS).
Available from: <http://www.rchiips.org/nfhs>
- 9) National Institute of Medical Statistics (NIMS), Indian Council of Medical Research (ICMR) and United Nations Children's Fund (UNICEF). Infant and child mortality in India: levels, trends and determinants. New Delhi: NIMS (ICMR) and UNICEF India Country Office; 2012.
- 10) Oestergaard M.Z., Inoue M., Yoshida S., Mahanani W.R., Gore F.M., Cousens S. et al. : Neonatal mortality levels for 193 countries in 2009 with trends since 1990: a systematic analysis of progress, projections, and priorities. *PLoS Med*. **8** (8): 2011; e1001080.
- 11) Pandey A, Bhattacharya BN, Sahu D, Sultana R. : Are too early, too quickly and too many births the high-risk births: an analysis of infant mortality in India using National Family Health Survey. *Demogr India* 2004; 33: 127-56.
- 12) Pandey A. : Infant and child mortality in India. India, 1998.
- 13) Raj A, Saggurti N, Winter M, Labonte A, Decker MR, Balaiah. D. et al. : The effect of maternal child marriage on morbidity INDIAN J MED RES, May 2015 and mortality of children under 5 in India: cross sectional study of a nationally representative sample. *BMJ* 2010; 340: b4258.
- 14) Ram F, Mohanty SK, Ram U. : Progress and prospects of millennium development goals in India. Mumbai: International Institute for Population Sciences; 2009.

- 15) Registrar General of India.1. SRS Bull 2014; 49: 1-3.
- 16) Shrestha S, Singh SD. : Outcome of preterm babies and associated risk factors in a hospital. J Nepal Med Assoc 2010; 49:286-90.
- 17) The Million Death Study Collaborators. Causes of neonatal and child mortality in India: a nationally representative mortality survey. Lancet 2010; 376: 1853-60.
- 18) UNICEF Global database 2018 : <https://data.unicef.org/topic/nutrition/infantand-young-child-feeding/>accessedon7/11/2019
- 19) UNICEF. Infant and child mortality in India: Levels, trends and determinants. 2012. www.unicef.org/India/Report.pdf
- 20) USAID. India's Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH + A) Strategy; 2014, pp. 1-44.
- 21) Weldearegawi B, Melaku YA, Abera SF, Ashebir Y, Haile F, Mulugeta A. et al. : Infant mortality and causes of infant deaths in rural Ethiopia: A population-based cohort of 3684 births. BMC Public Health 2015; 15:1-7.
- 22) World Health Organization, UNICEF, UNFPA, World Bank. *Trends in maternal mortality: 1990 to 2008*. 2010; WHO: Geneva, Available at : <http://www.who.int/reproductivehealth/publications/monitoring/9789241500265/en/index.html>