

Original Research Article

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Pattern of Infant Mortality among the Gond Tribe in Satna District of Madhya Pradesh, India

Neelash Patel* and S. S. Gautam

Department of Physical Science, MGCGV, Chitrakoot, Satna (M.P.) 485334

*Corresponding author

ABSTRACT

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This study examines the socio-demographic factors and pattern of child mortality among the Gond tribe in selected blocks of Satna district, Madhya Pradesh. A community-based survey was conducted among 421 households having children aged 0–5 years using a structured interview schedule. The results show that most households were nuclear, with low levels of education and a high dependence on agricultural labour. Living conditions were modest, characterized by small landholdings, kachcha housing, poor sanitation, and reliance on traditional cooking fuels. Child mortality was reported in 3.5% of households, with relatively higher incidence in Nagod block. Female mortality was slightly higher than male mortality. The leading causes of death were pneumonia, low birth weight, diarrhea, and fever, indicating largely preventable conditions. The findings suggest that child mortality in the study area is closely linked to socio-economic disadvantages, environmental conditions, and limited use of healthcare services. Improving maternal and child healthcare, sanitation, and awareness at the community level is essential for reducing preventable child deaths among the Gond population.

Introduction

The Infant Mortality Rate (IMR), which is widely accepted as a crude indicator of the overall health scenario of a country or a region, is defined as the infant deaths (less than one year) per thousand live births in a given time period and for a given region (Sample Registration System (SRS), 2023, the maximum IMR has been reported in Chhattisgarh, Madhya Pradesh and Uttar Pradesh). Infant mortality rate (IMR) (infant deaths per 1000 live births) has declined in last decades in India (50) and in Gujarat (48) 2 though it is still high compared

to developed countries (RGI, GOI, 2011 & the world fact book, 2011). With decrease in IMR, it becomes important to find out various types of determinants and their interplay leading to the infant deaths. Research studies in India so far have explored the causes and determinants of infant mortality focusing mainly on biological ones and the use of health services. 1 In industrial world, dominant factor of decline in infant mortality has been the social and economic progress with medical services playing the secondary role (K Park, 2011). Therefore in a scenario where the IMR is on decline, the social, economic or demographic

determinants assume important role than the biological ones. Elaboration of the social profile of the infant deaths explains how social factors are the main determinants of IMR. To our best of knowledge no such community-based study has been undertaken in study blocks of Satna district of Madhya Pradesh, with emphasis on socio-demographic aspects. Study was undertaken with objective of generating socio-demographic profile for all infant deaths.

Material and Methods

Study Area and Population

The study was conducted in Satna district of Madhya Pradesh, a state with a substantial tribal population. As per Census 2011, Madhya Pradesh has a population of 72.62 million, of which 21% (15.31 million) belong to Scheduled Tribes, representing one of the largest tribal populations in India. Among these, the Gond tribe constitutes the dominant tribal group in Satna district, which has a total tribal population of 319,975. The study was confined to Gond-dominated villages to understand child care practices and determinants of child mortality. Three rural blocks—Unchahara, Majhgawan, and Nagod—were purposively selected due to their high tribal concentration and relative distance from urban centers.

Research Design and Sampling

A community-based cross-sectional design was adopted. The study included 421 households having children in the age group of 0–5 years. Villages were selected proportionately across the three blocks. Assuming the availability of approximately 10 eligible households per village, the required number of villages was covered to achieve the desired sample size.

Households were identified with the assistance of village-level health workers (Anganwadi workers), and all eligible households were surveyed. One respondent (mother) per household was interviewed. A systematic approach with a skipping pattern was used where necessary to ensure efficiency and avoid duplication.

Data Collection Methods

Data were collected using a pre-tested semi-structured interview schedule designed in accordance with the study

objectives. Information was obtained on socio-demographic characteristics, housing conditions, sanitation, maternal and child health practices, and child mortality. To reduce recall bias, data were collected with reference to the youngest child in the household.

In addition to the household survey, qualitative data were gathered through in-depth interviews with selected respondents, including household heads, traditional birth attendants (Dai), village leaders, and local health workers. Participatory Rural Appraisal (PRA) techniques such as Focus Group Discussions (FGDs), matrix ranking, and resource mapping were conducted with mothers (below and above 30 years of age) as well as fathers to understand community perceptions regarding healthcare services and needs.

Variables and Measurements

The study included variables related to family structure, household size, education, occupation, landholding, housing type, sanitation, fuel use, and access to healthcare services. Information on child mortality, including sex-wise distribution and causes of death, was also recorded. Additional details such as place of delivery, complications, referral practices, and the role of ASHA workers were documented.

Data Processing and Analysis

Data were entered and managed using Microsoft Excel (2024) and subsequently cleaned and coded. Statistical analysis was performed using IBM SPSS Statistics Version 28.0. Both descriptive and inferential statistical techniques were applied, including bivariate and multivariate analyses with controlled variables wherever required. Appropriate tests of significance were used to examine relationships between variables.

Qualitative data obtained from FGDs and in-depth interviews were transcribed, coded, and thematically analyzed to complement and validate the quantitative findings.

Result and Discussion

The distribution of households according to family type (Table 3.1) indicates that a majority of Gond households (68.6%) belonged to nuclear families, while 31.3% were joint families. Block-wise analysis shows that nuclear

families were predominant in all three blocks, with the highest proportion in Nagod (75.7%), followed by Majhgawan (71.4%) and Unchahara (65.4%). This trend reflects a gradual shift from traditional joint family systems toward nuclear family structures among tribal communities, possibly due to socio-economic transitions and changing livelihood patterns.

As presented in Table 3.2, most households consisted of small to medium-sized families. About 36.1% households had three members, followed by 30.4% with four members and 14.9% with five members. Larger family sizes (six or more members) were relatively less common. This pattern suggests a predominance of moderate household size, which may influence resource allocation and child care practices within households.

Table 3.3 reveals that literacy levels among Gond households remain low. About 19.0% households were illiterate, while the majority (43.2%) had only primary education. Higher education levels such as intermediate (2.8%) and graduation (1.9%) were very limited. The low level of educational attainment may adversely affect awareness regarding health, nutrition, and utilization of healthcare services, thereby influencing child survival outcomes.

The occupational structure (Table 3.4) shows that agriculture labour was the dominant occupation (42.9%), followed by housewives (37.7%) and labourers (11.4%).

Only a small proportion of households were cultivators (5.2%) or engaged in government and private services. This indicates a high dependence on unskilled and seasonal employment, reflecting economic vulnerability among the Gond population.

As shown in Table 3.5, a majority of households (86.4%) possessed agricultural land, whereas 13.5% were landless. Although land ownership is relatively high, it does not necessarily translate into economic stability due to small landholding sizes and low agricultural productivity.

Table 3.6 indicates that most land-owning households (81.9%) possessed small landholdings (1–4 acres), followed by 17.3% with 5–9 acres. Only 1.1% had land between 10–14 acres, and none had large landholdings above 15 acres. This highlights the predominance of marginal farming, which may limit income generation and affect household nutrition and health.

Housing conditions (Table 3.7) reveal that 54.1% households lived in kachcha houses, 35.3% in mixed houses, and only 12.8% in pakka houses. Poor housing conditions increase exposure to environmental risks such as infections and poor sanitation, which are critical determinants of child health.

Table 3.8 shows that ownership of consumer goods was limited. Mobile phones and watches were the most commonly owned assets, whereas ownership of appliances such as televisions, fans, and other items was relatively low. This indicates modest living standards and limited access to modern amenities among the Gond households.

As indicated in Table 3.9, bicycles were the most common mode of transport across all blocks, followed by motorcycles. Ownership of tractors and animal-drawn carts was minimal. Limited access to transport facilities may affect accessibility to healthcare services, especially in emergency situations.

Table 3.10 shows that most households (60.5%) had double-room houses, followed by single-room houses (22.5%). Only a small proportion had three or more rooms. Limited housing space may contribute to overcrowding, increasing the risk of communicable diseases among children.

Sanitation conditions (Table 3.11) were found to be inadequate. About 69.5% households used open pit toilets, while 24.7% practiced open defecation. Only 5.7% households had improved sanitation facilities. Poor sanitation is a major risk factor for diarrheal diseases, which significantly contribute to child mortality. Table 3.12 shows that all households (100%) had access to electricity. This indicates successful electrification in the study area, which may positively influence living standards and access to information.

As per Table 3.13, a majority of households (66.7%) depended on traditional fuels such as wood, dung, and coal, while only 33.2% used LPG. Use of traditional fuels contributes to indoor air pollution, which is associated with respiratory diseases among children.

Table 3.14 indicates that most respondents (51.7%) were in the age group of 25–29 years, followed by 23.9% in the 19–24 years group. This reflects that the majority of respondents were in the reproductive age group, which is crucial for studying child health and mortality patterns.



Figure 1. Data Collection at Respondent's Residence



Figure 2. Household Interview during Field Survey



Figure 3. Community Visit



Figure 4. Interaction with Anganwadi Worker

Table.1 Type of Household

Type of family	Unchahara	Majhgawan	Nagod	Total
Nuclear family	144(65.4%)	120(71.4%)	25(75.7%)	289(68.6%)
Joint family	76(34.5%)	48(28.57%)	8(24.2%)	132(31.3%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.2 Number of person/size per household

Number of person/size	Unchahara	Majhgawan	Nagod	Total
1.	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
2.	75 (34.0%)	64(38.0%)	13(39.3%)	152(36.1%)
3.	62(28.1%)	57(33.9%)	9(27.2%)	128(30.4%)
4.	41(18.6%)	18(10.7%)	4(12.1%)	63(14.9%)
5.	19(8.6%)	16(9.5%)	3(9.0%)	38(9.0%)
6.	15(6.8%)	6(3.5%)	1(3.0%)	22(5.2%)
7.	5(2.2%)	4(2.3%)	2(6.0%)	11(2.2%)
8.	3(1.3%)	3(1.7%)	1(3.0%)	7(1.6%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.3 Educational status of household

Educational status	Unchahara	Majhgawan	Nagod	Total
Illiterate	51(23.1%)	22(13.0%)	7(21.2%)	80(19.0%)
Primary	98(44.5%)	72(42.8%)	12(36.3%)	182(43.2%)
Middle	38(17.2%)	31(18.4%)	7(21.2%)	76(18.0%)
High School	26(11.8%)	25(14.8%)	3(9.0%)	54(12.8%)
Intermediate	4(1.8%)	7(4.1%)	1(3.0%)	12(2.8%)
Graduate	1(0.4%)	6(3.5%)	1(3.0%)	8(1.9%)
Read/Write	2(0.9%)	5(2.9%)	2(6.0%)	9(2.1%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.4 Main Occupation of households

Main Occupation	Unchahara	Majhgawan	Nagod	Total
Cultivator	3(1.4%)	15(8.9%)	5(15.5%)	22(5.2%)
Agri.labour	112(50.7%)	57(33.9%)	12(36.3%)	181(42.9%)
Labour	7(3.2%)	37(22.0%)	4(12.1%)	48(11.4%)
Govt. Servant	2(0.9%)	3(1.7%)	2(6.0%)	7(1.6%)
Private Service	0(0.0%)	2(1.1%)	1(3.0%)	3(0.7%)
House Wife	96(43.6%)	54(32.1%)	9(27.2%)	159(37.7%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.5 Agriculture land of Household

Agriculture land	Unchahara	Majhgawan	Nagod	Total
Yes	183(83.1%)	154(91.6%)	27(81.8%)	364(86.4%)
No	37(16.1%)	14(8.3%)	6(18.1%)	57(13.5%)
Total	220(100.0%)	168(100.0%)	33(100.0%)	421(100.0%)

Table.6 Size of land per Household

Size of land	Unchahara	Majhgawan	Nagod	Total
1-4	179(81.3%)	140(83%)	26(78.7%)	345(81.9%)
5-9	41(18.6%)	26(15.7%)	6(18.1%)	73(17.3%)
10-14	0(0.0%)	2(1.1%)	3(3.0%)	5(1.1%)
15+	0(0.0%)	(0.0%)	(0.0%)	0(0.0%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.7 Type of Housing structure of Household

Housing structure	Unchahara	Majhgawan	Nagod	Total
Kachcha house	125(56.8%)	91(54.1%)	12(36.3%)	228(54.1%)
Pakka house	26(11.8%)	23(13.6%)	5(15.1%)	54(12.8%)
Mixed house	69(31.3%)	64(38.0%)	16(48.4%)	149(35.3%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.8 Household Possessions

Possessions	Unchahara	Majhgawan	Nagod
Fan/Cooler	45(20.4%)	29(17.2%)	11(33.3%)
Radio/Transistor	9(4.0%)	11(6.5%)	2(6.0%)
B/W TV	9(4.0%)	4(2.3%)	2(6.06%)
CTV	24(10.9%)	21(12.5%)	12(36.3%)
Tape recorder	0(0.0%)	4(2.3%)	0(0.0%)
DVD player	36(16.3%)	31(18.4%)	3(9.0%)
Swing Machine	1(0.4%)	0(0.0%)	0(0.0%)
Mobile	122(55.4%)	143(85.1%)	22(66.6%)
Watch	175(79.5%)	147(87.5%)	25(75.5%)
Water Pump	4(1.8%)	4(2.3%)	1(3%)
Thresher	0(0.0%)	2(1.9%)	0(0.0%)

Table.9 Means of Transport

Transport	Unchahara	Majhgawan	Nagod
Bicycle	123(55.9%)	81(48.2%)	13(39.3%)
Motor cycle	25(11.3%)	54(32.1%)	7(21.2%)
Animal Drawn Cart	5(2.2%)	1(0.59%)	1(3.0%)
Tractor	1(0.45%)	4(2.3%)	1(3.0%)

Table.10 Number of rooms per houses

Number of rooms	Unchahara	Majhgawan	Nagod	Total
Single room	55(25.0%)	35(20.8%)	5(15.1%)	95(22.5%)
Double room	127(57.7%)	104(61.9%)	24(72.7%)	255(60.5%)
Triple room	25(11.3%)	20(11.9%)	3(9.0%)	48(11.4%)
Four room	13(5.9%)	9(5.3%)	1(3.0%)	23(5.4%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.11 Toilet facility of households

Toilet facility	Unchahara	Majhgawan	Nagod	Total
Self flush toilet	15(6.8%)	7(4.1%)	2(6.0%)	24(5.7%)
Open pit toilet	150(68.1%)	125(74.4%)	18(54.5%)	293(69.5%)
Open defecation	55(25.0%)	36(21.4%)	13(39.4%)	104(24.7%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.12 Source of lighting of household

Source of lighting	Unchahara	Majhgawan	Nagod	Total
Electricity	220(100%)	168(100%)	33(100%)	421(100%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.13 Fuel commonly use by household

Type of Fuel	Unchahara	Majhgawan	Nagod	Total
Wood/Dung/Coal	148(67.2%)	108(64.2%)	25(75.7%)	281(66.7%)
Kerosene	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
LPG	72(32.7%)	60(35.7%)	8(24.2%)	140(33.2%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.14 Age group of households

Age group	Unchahara	Majhgawan	Nagod	Total
15-19	1(0.45%)	1(0.59%)	0(0.0%)	2(.47%)
19-24	53(24.0%)	37(22.0%)	11(33.3%)	101(23.9%)
25-29	114(51.8%)	87(51.7%)	17(51.5%)	218(51.7%)
30-34	41(18.6%)	36(21.42%)	3(9.0%)	80(19.0%)
35-39	10(4.5%)	5(2.9%)	2(6.0%)	17(4.3%)
40+	1(0.4%)	2(1.1%)	0(0.0%)	3(.7%)
Total	220(100%)	168(100%)	33(100%)	421(100%)

Table.15 Child mortality (two years)

Block	Block wise child mortality		Total
	Yes	No	
Unchahara	7(3.1%)	213(96.8%)	220(100%)
Majhgawan	5(2.9%)	163(97.0%)	168(100%)
Nagod	3(9.0%)	30(90.9%)	33(100%)
Total	15(3.5%)	406(96.4%)	421(100%)

Table.16 Sex-wise child mortality

Block	Block wise mortality by sex			Total
	No	Male	Female	
Unchahara	213(96.8%)	4(1.8%)	3(1.3%)	220(100%)
Majhgawan	163(97.0%)	2(1.1%)	3(1.7%)	168(100%)
Nagod	30(90.9%)	1(3.0%)	2(6.0%)	33(100%)
Total	406(96.4%)	7(1.6%)	8(1.9%)	421(100%)

Table.17 Cause of mortality

Block	Block wise Cause of mortality						Total
	No	Diarrhea	Pneumonia	Low weight	High fever	Other	
Unchahara	213(96.81%)	1(0.4%)	2(0.9%)	2(0.9%)	1(0.4%)	1(0.4%)	220(100%)
Majhgawan	163(97.0%)	0(0.0%)	2(1.1%)	1(0.5%)	0(0.0%)	2(1.1%)	168(100%)
Nagod	30(90.9%)	1(3.0%)	1(3.0%)	0(0.0%)	0(0.0%)	1(3.0%)	33(100%)
Total	406(96.4%)	2(0.4%)	5(1.1%)	3(0.7%)	1(0.2%)	4(0.9%)	421(100%)

Table.18 Provided treatment of children

Block	Block wise		Total
	No	Yes	
Unchahara	213(96.81%)	7(3.1%)	220(100%)
Majhgawan	163(97.0%)	5(2.9%)	168(100%)
Nagod	30(90.9%)	3(9.0%)	33(100%)
Total	406(96.4%)	15(3.5%)	421(100%)

Table 3.15 shows that child mortality was reported in 3.5% households during the last two years. Block-wise variation indicates higher mortality in Nagod (9.0%) compared to Unchahara (3.1%) and Majhgawan (2.9%). This variation suggests disparities in healthcare access and socio-economic conditions across blocks.

As shown in Table 3.16, female child mortality (1.9%) was slightly higher than male mortality (1.6%). Although the difference is small, it indicates potential

gender-based disparities in care or health-seeking behaviour. Table 3.17 reveals that pneumonia, low birth weight, diarrhea, high fever, and other illnesses were the major causes of child mortality. Pneumonia and low birth weight emerged as leading causes. These conditions are largely preventable and indicate gaps in maternal care, nutrition, and timely medical intervention.

Table 3.18 indicates that only 3.5% households reported seeking treatment for child illnesses related to mortality

cases. Although government health services were utilized, the low proportion suggests delayed or limited healthcare utilization. Barriers such as lack of awareness, accessibility issues, and economic constraints may influence treatment-seeking behaviour.

The study concludes that child mortality among the Gond tribe in Satna district is influenced largely by socio-economic and environmental conditions rather than biological factors alone.

Although the overall mortality level (3.5%) is relatively low, variations across blocks indicate inequalities in healthcare access and living conditions.

Low educational status, dependence on agricultural labour, marginal landholdings, poor housing, and inadequate sanitation were identified as key factors contributing to child vulnerability. The major causes of mortality—pneumonia, diarrhea, and low birth weight—are largely preventable, highlighting gaps in maternal care, nutrition, and timely medical intervention.

Despite the availability of basic health services, their utilization remains limited. Therefore, improving awareness, strengthening primary healthcare delivery, and enhancing sanitation and nutrition are essential to reduce child mortality. A comprehensive, community-based approach is required to achieve sustainable improvements in child survival among the Gond population. Further longitudinal studies involving larger tribal populations are recommended to strengthen the evidence on determinants of child mortality.

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Author Contributions

Neelash Patel: Investigation, formal analysis, writing—original draft. S. S. Gautam: Validation, methodology, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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