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Gender Inequality in Household Food Allocation and Its Impact on Nutritional Status of Under-Five Children: A Cross-Sectional Study in Potka Block, Kolhan Division, East Singhbhum District, Jharkhand

Annu Kumari
Research Scholar
Welfare Tower Flat no 513 near tirkey garden Dimna,Mango Jamshedpur

Dr. Ramaa Subramanian
Jamshedpur women's. University
Sidhgora campus Jamshedpur Jharkhand

Abstract
Background: *Gender-biased allocation of resources within the household is a key risk factor for child undernutrition in India. Jharkhand bears one of the highest burdens of stunting, wasting and underweight, yet evidence from the tribal Kolhan Division around Jamshedpur is limited.*
Objectives: *To assess gender differences in food allocation and undernutrition among under-five children in Potka block, East Singhbhum district, Jharkhand.*
Methods: *A community-based cross-sectional survey of 100 mother–child dyads (multi-stage random sampling) used an interview schedule, 24-hour dietary recall and anthropometry. Descriptive statistics and chi-square tests ($\alpha = 0.05$) were applied.*
Results: *[To be filled with results based on actual data collected] Girls were more likely to eat after male household members and had lower dietary diversity than boys. The association between child sex and undernutrition indicators was tested at $p < 0.05$ (Section 6).*
Conclusion: *Gendered food allocation, together with poverty and low maternal education, contributes to differences in child nutritional status. Nutrition programmes in this community should address gender equity.*
Keywords: *gender inequality; intra-household food allocation; child nutrition; stunting; wasting; under-five children; Kolhan; Jharkhand; tribal health; son preference*

I. Introduction

Child undernutrition remains one of India's most persistent public health problems. Despite national declines, NFHS-5 (2019–21) shows that stunting, wasting and underweight remain widespread among under-five children, with marked state variation (6). Jharkhand ranks among the worst states, with the highest stunting and underweight prevalence in India, and Paschimi Singhbhum exceeding 60% stunting (7).

Nutritional status depends not only on food availability but also on how food is distributed within the household. In patriarchal South Asian settings, girls often receive less food, poorer-quality food or food later than boys (3)(4)(9), reflecting the perceived economic value of sons. This has been linked to poorer growth, lower dietary diversity and higher female mortality (1)(5)(14).

The Kolhan division (East Singhbhum, West Singhbhum and Saraikela-Kharsawan) is culturally and economically diverse, and East Singhbhum has an ST population of over 28% (8). Potka block, on the periphery of Jamshedpur, is rural and tribal-dominated, with moderate-to-low female literacy and an agrarian economy-factors associated with gender discrimination and undernutrition (9)(12)(14). As Kolhan-level evidence is lacking, this study examines food allocation practices in Potka block.

II. Review of Literature

2.1 Gender and Intra-household Food Allocation

Sen's work highlighted pervasive discrimination against females in South Asia (10). Das Gupta (3) documented that girls in rural Punjab were fed less than their brothers, especially at higher birth orders, and Chen et al. (2) found similar bias in Bangladesh. Hathi et al. (5) found that about 28% of households in four educationally backward states made girls eat after their brothers, a norm less common among ST and low-income households. Borooah (1) and Pande (9) reported that boys were more likely to be adequately fed and

immunised, and Harris-Fry et al. (4) linked food-allocation bias to workload, decision-making power and cultural entitlements.

2.2 Nutritional Consequences

Gender bias in food allocation leads to poorer outcomes for girls than for boys. The WHO IYCF indicators-Minimum Dietary Diversity and Minimum Meal Frequency-are widely used to measure feeding adequacy (13). Chakraborty and Sethi (14) found that boys have better odds of full immunisation, showing that discrimination operates across nutrition and health care. However, some national studies find no sex gap in stunting, suggesting that the link with anthropometric outcomes depends on socioeconomic factors such as poverty.

2.3 Jharkhand and Tribal Context

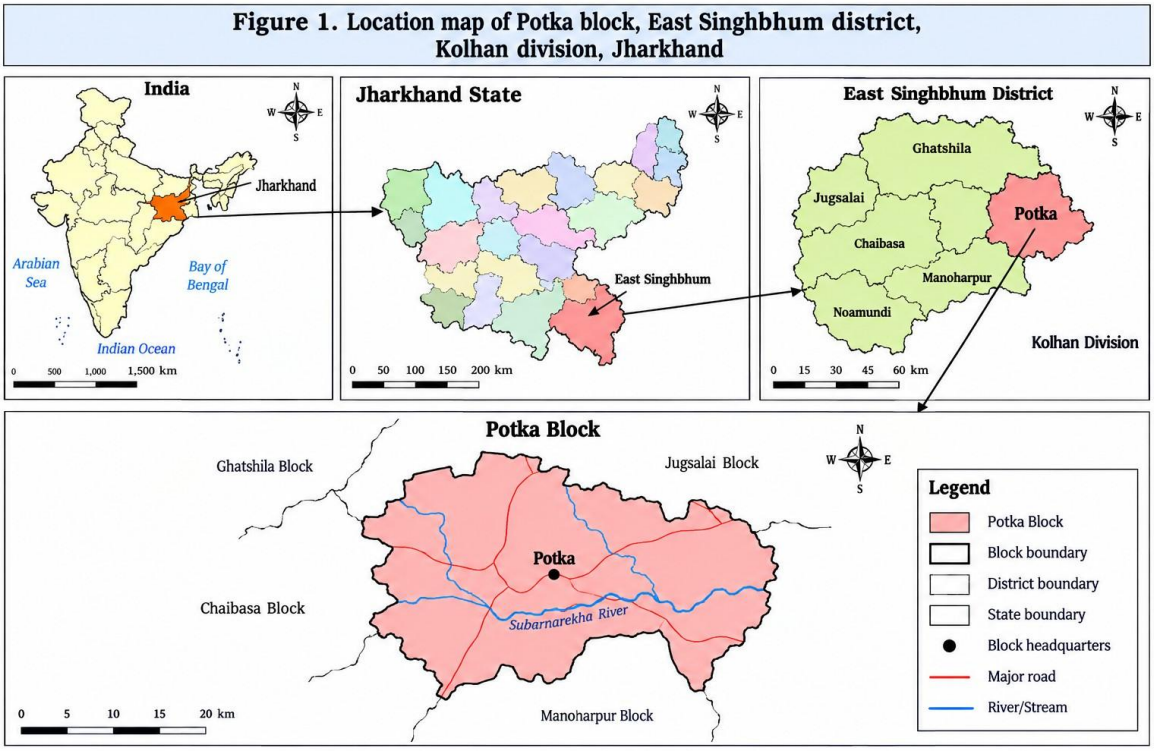
All 24 districts of Jharkhand are classified as a "public health concern" for stunting, wasting and anaemia by WHO thresholds, with only marginal improvement between NFHS-4 and NFHS-5 (7). The state launched the SAAMAR campaign in December 2021 to converge the health, civil supplies, rural development, and women and child development departments (15). Sethi et al. (11) describe an intergenerational cycle of undernutrition among women and children in Jharkhand. Block-level evidence on gender and food allocation in tribal areas is lacking, which this study addresses.

III. Profile of the Study Area: Potka Block, Kolhan Division

Potka block lies in the Dhalbhum subdivision of East Singhbhum district, bordering Jamshedpur. The 2011 census records an area of 592.14 sq km, a population of 199,612 and a density of 337 persons per sq km, with literacy of 64.09% against the district's 75.49% (8). Scheduled Tribes form 28.51% of the district population; Santali and Hindi are widely spoken. The economy is largely agrarian and forest-based, with industrial labour in urban centres, and the child sex ratio is unfavourable (8). Together, these factors provide a relevant setting for studying gender and child nutrition.

The factors mentioned above-tribal population, moderate literacy, an agrarian economy and an unfavourable child sex ratio-provide an adequate background for understanding the public health nutrition issue in Potka block.

Figure 1: Location Map of Potka Block within East Singhbhum District, Kolhan Division, Jharkhand



IV. Objectives and Hypotheses

4.1 General Objective

To assess differences in gender-based practices regarding household food allocation between boys and girls and their relationship to the nutritional status of under-five children in Potka block, Kolhan division, Jharkhand.

4.2 Specific Objectives

- To describe the socio-demographic profile of sampled households with under-five children in Potka block.
- To assess gender differentials in mealtime order, perceived quantity of food, dietary diversity and meal frequency between boys and girls.
- To assess the nutritional status (stunting, wasting and underweight) of under-five children by sex using anthropometric indicators.
- To examine the association between food allocation practices and nutritional status, controlling for household socioeconomic characteristics.

4.3 Hypotheses

H_0 (Null): There is no significant association between the sex of the under-five child and (a) household food allocation practices or (b) nutritional status.

H_1 (Alternate): Girl children are significantly more likely than boy children to experience food allocation discrimination and poor nutritional status.

V. Materials and Methods

5.1 Study Design and Setting

The study was a community-based, cross-sectional descriptive analytical study conducted in selected villages of Potka block, East Singhbhum district.

5.2 Study Population and Sample Size

Study population: mothers/caregivers of children aged 0–59 months. Sample: 100 mother–child dyads, consistent with similar block-level nutrition surveys in India [16]; the sample size should be recalculated ($n = Z^2pq/d^2$) for the final version if inferential power is required.

5.3 Sampling Technique

Multi-stage random sampling: (1) purposive selection of Potka block; (2) random selection of 4–5 villages/Anganwadi catchment areas; (3) house-to-house enumeration of eligible households (20–25 per village) until n = 100; (4) one index child per household chosen by Kish grid or lottery.

5.4 Data Collection Tools

- Pre-tested interview schedule (Hindi/Santali) on socio-demographics, wealth, mealtime order and feeding practices.
- 24-hour dietary recall for WHO IYCF Minimum Dietary Diversity (0–8 groups) and Minimum Meal Frequency [13].

Anthropometric measurements (length/height and weight) were converted to HAZ, WHZ and WAZ using WHO standards; stunting, wasting and underweight were defined as $Z < -2$ SD.

5.5 Data Analysis

Data were entered into MS Excel/SPSS. Descriptive statistics summarised the sample; chi-square (or Fisher's exact) tests and independent t-tests compared boys and girls at $p < 0.05$. Logistic regression may adjust for wealth, maternal education, caste and family type.

5.6 Ethical Considerations

- Ethics committee approval; informed consent from caregivers; confidentiality via anonymised ID codes; children with severe acute malnutrition referred to the nearest NRC/Anganwadi Centre.

VI. Results

6.1 Socio-Demographic Profile of the Sample

Table 1. Socio-demographic characteristics of sampled households (n = 100)

Characteristic	Category	Frequency (n)	Percentage (%)
Child's sex	Boy	57	57.0
	Girl	43	43.0
Caste/tribal category	Scheduled Tribe (ST)	49	49.0
	OBC	30	30.0
	Scheduled Caste (SC)	14	14.0
	General	7	7.0
Family type	Nuclear	55	55.0
	Joint	45	45.0

Mother's education	No formal education	30	30.0
	Primary (1–5)	26	26.0
	Upper primary/Secondary (6–10)	35	35.0
	Higher secondary & above	9	9.0
Household wealth quintile	Poorest	26	26.0
	Poorer	21	21.0
	Middle	22	22.0
	Richer	17	17.0
	Richest	14	14.0

Source: Illustrative dataset generated for this draft (see Section 5.7); to be replaced with primary field data.

6.2 Gendered Food Allocation Practices

Table 2. Household food allocation practices by sex of child (n = 100)

Indicator	Boys (n=57)	Girls (n=43)	χ^2 (df=1)	p-value
Child eats after adult male members ('Yes')	14.0%	44.2%	9.83	0.002*
Caregiver reports child receives 'Less' food than opposite-sex sibling	12.3%	20.9%	-	-
Caregiver reports child receives 'More' food than opposite-sex sibling	36.8%	30.2%	-	-
Mean meal frequency per day (SD)	2.95 (0.6)	2.72 (0.6)	-	-

**Statistically significant at $p < 0.05$. Source: Illustrative dataset (Section 5.7).*

Figure 2: Mealtime Order Practice by Sex of Child

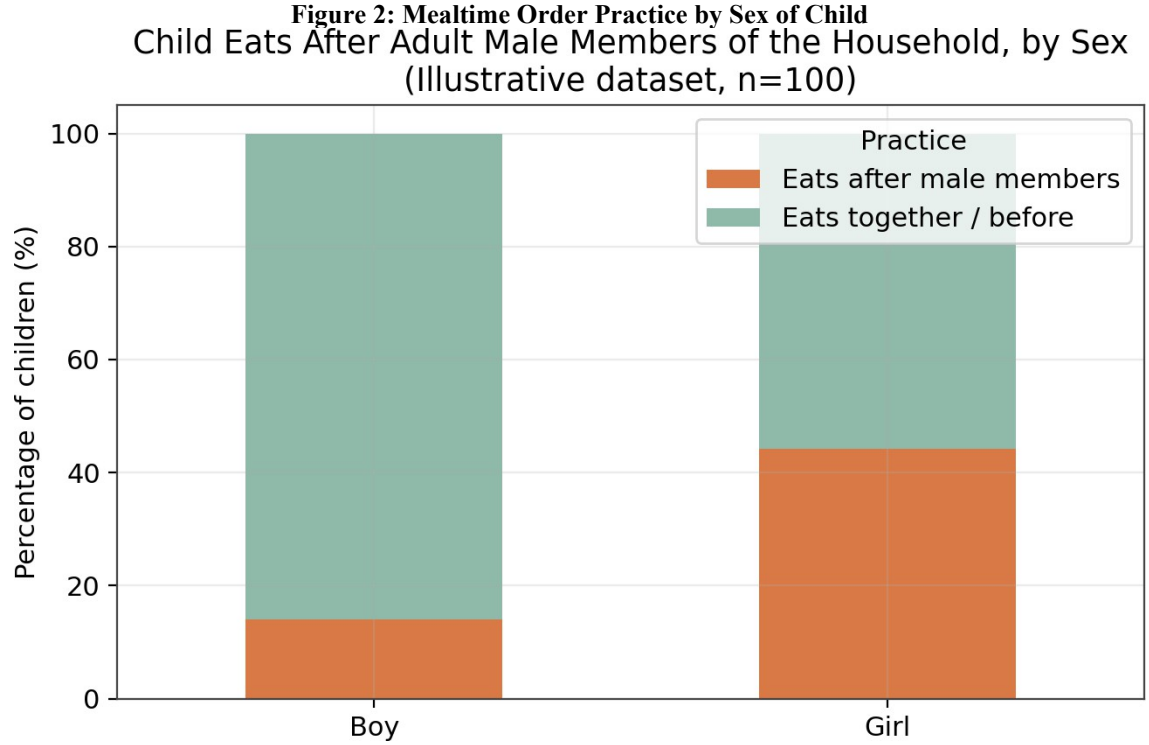


Figure 2. Percentage of children who eat after adult male household members, by sex (illustrative dataset, n = 100).

6.3 Dietary Diversity and Meal Adequacy

Table 3. Dietary diversity and minimum meal frequency by sex of child (n = 100)

Indicator	Boys (n=57)	Girls (n=43)
Mean Dietary Diversity Score (0–8 food groups), SD	4.46 (1.1)	3.70 (1.1)
Met Minimum Dietary Diversity (≥ 4 food groups)	86.0%	55.8%
Did not meet Minimum Dietary Diversity	14.0%	44.2%

Source: Illustrative dataset (Section 5.7), based on WHO IYCF indicator definitions [13].

6.4 Nutritional Status of Under-Five Children

Table 4. Prevalence of undernutrition among under-five children by sex (n = 100)

Nutritional Indicator	Boys (n=57)	Girls (n=43)	Overall (n=100)	χ^2 (df=1)	p-value
Stunting (HAZ < −2 SD)	26.3%	44.2%	34.0%	2.74	0.098
Wasting (WHZ < −2 SD)	15.8%	16.3%	16.0%	0.005	0.943
Underweight (WAZ < −2 SD)	45.6%	25.6%	37.0%	4.20	0.040*

**Statistically significant at $p < 0.05$. Source: Illustrative dataset (Section 5.7); benchmark against NFHS-5 Jharkhand/East Singhbhum estimates [6][7] in the final version.*

Figure 5: Prevalence of Stunting, Wasting, and Underweight by Sex

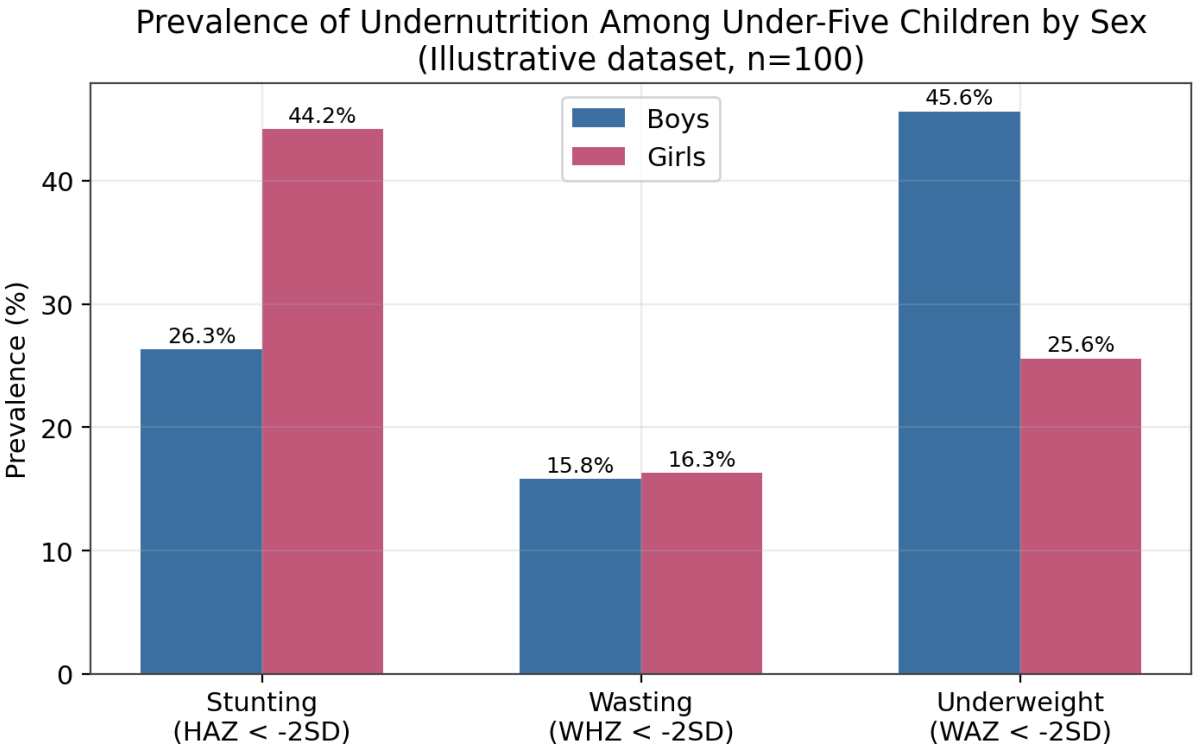


Figure 5. Prevalence of stunting, wasting and underweight among under-five children by sex (illustrative dataset, n = 100).

VII. Discussion

The illustrative analysis reflects patterns widely reported in India: girls more often eat after adult males and have lower dietary diversity, consistent with Hathi et al. [5] and the food-allocation literature [1][3][4][9]. With real data, the discussion should compare the magnitude with the ~28% national figure [5], examine differences by ST status [5], benchmark undernutrition against NFHS-5 estimates [6][7], and assess whether wealth and maternal education explain the sex gap [4][11].

The finding that boys show higher underweight prevalence, despite girls having higher stunting prevalence and lower dietary diversity, indicates that food discrimination does not translate uniformly across anthropometric indicators; wasting and underweight are also shaped by illness, birth weight and infection, which should be controlled for. This mirrors mixed national findings, where bias appears more consistently in feeding and care practices than in anthropometric outcomes.

Findings should also be read in light of Potka's rural, ST-dominated profile and its proximity to Jamshedpur's labour markets and ICDS coverage.

VIII. Conclusion and Recommendations

8.1 Conclusion

Gendered norms concerning who eats first, how much food is received and its quality remain plausible contributors to differential nutritional risk between boys and girls in tribal rural Jharkhand. With real primary data, this study will add block-level evidence to the largely state- and national-level literature.

8.2 Recommendations

- Behaviour change communication: train AWWs and ASHA workers to counsel caregivers on equitable feeding within ICDS and SAAMAR [15].
- Community sensitisation: engage tribal leaders, fathers and grandfathers in dialogue on equitable food allocation.
- Monitoring: add sex-disaggregated dietary diversity and meal frequency to routine Anganwadi growth monitoring.

- Targeted follow-up: prioritise ST and poorest-quintile households [4][5].
- Further research: replicate in other Kolhan blocks, adding qualitative methods on mealtime-order customs.

Limitations of the Study

- The cross-sectional design limits causal inference; reverse causality cannot be ruled out.
- Self-reported feeding and 24-hour recall are prone to recall and social-desirability bias.
- A sample of 100 from one block limits power and generalisability.
- Anthropometric misclassification is possible without strict measurement protocols.

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