



# A Descriptive Study of Clinico-Sociodemographic Profile of Malnourished Children Under 5 Years of Age Admitted at Tertiary Care Hospital, Rajasthan, India

(Study of clinico-socio-demographic profile of malnourished children under 5 years of age)

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## KEYWORDS

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## ABSTRACT:

**Background:** Malnutrition is a significant public health challenge, especially in developing countries. Malnutrition linked to multiple clinical and socio-demographic factors and often interconnected. Addressing malnutrition requires context-specific interventions for preventing it. Study aim to describe Clinico - Sociodemographic profile of malnourished children under 5 years of age.

**Material and Methods:** A hospital-based, cross-sectional study was conducted from April to December 2023, involving 310 malnourished children at tertiary care hospital, Rajasthan, India. A validated, semi-structured, interviewer-administered questionnaire used for data collection. Descriptive Statistics was performed using MS Excel and SPSS version 25.

**Results:** Among 310 malnourished children, 177 (57.1%) were male, 195 (62.9%) aged 7–24 months and 198 (63.9%) belonged to the upper-lower socioeconomic class. Mothers of 106 (34.2%) were illiterate and 172 (55.5%) had four or more antenatal visits. Term deliveries accounted for 256 (82.6%) births and 145 (46.8%) children having low birth weight. Children 213 (68.7%) were fully vaccinated. Moderate acute malnutrition was present in 62 (20%), while 248 (80%) had severe acute malnutrition. Severe underweight, wasting and stunting were seen in 245 (79%), 248 (80%), and 163 (53%) respectively. Average hospital stay was  $10.3 \pm 10.9$  days.

**Conclusions:** Majority children were severely malnourished, with severe acute malnutrition (SAM) being more prevalent than moderate acute malnutrition (MAM). Study highlights various socio-demographic, maternal characteristics and clinical profile founded in



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malnourished children. Address these helps to formulate strategies focused specific interventions for preventing malnutrition.

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**Introduction:** Malnutrition refers to an imbalance in energy and nutrient intake and encompasses three main types- Under-nutrition (wasting, stunting, underweight), Micronutrient-related malnutrition (deficiencies or excesses of vitamins and minerals) and Overweight or obesity, which are linked to diet-related non-communicable diseases like heart disease, stroke, diabetes and some cancers[1].

Severe acute malnutrition (SAM) is a critical public health issue contributing significantly to child mortality worldwide. It is defined in children aged 6–59 months by a mid-upper arm circumference (MUAC) of less than 11.5 cm, severe wasting (weight-for-height/length below -3 SD), or the presence of pitting nutritional edema[2]. SAM accounts for approximately one million deaths in children under five annually[3]. The risk of death for children with SAM is estimated to be nine times higher than for well-nourished children[4]. Acute respiratory infections, especially pneumonia, are leading causes of morbidity and mortality in this group, with risk factors including poverty, low income, large family size, low parental education, low birth weight, lack of breastfeeding, pollution, young age, and malnutrition[5]. Around one-third of adult women are underweight, and poor care during pregnancy leads to about 30% of newborns having low birth weight, which predisposes them to future malnutrition and disease[6].

The causes of malnutrition are multifarious and include immediate (individual), underlying (household/family), and basic (community) factors, with inadequate dietary intake and poor health status as immediate causes[7–8]. The World Health Assembly aims to eliminate all forms of malnutrition by 2030, with UNICEF and WHO supporting efforts to monitor and improve nutrition in low and middle-income countries (LMICs). Socioeconomic status, geographic location, maternal behavior, education, and healthcare access significantly influence childhood malnutrition in these regions[9–12].

Globally 1.9 billion adults are overweight or obese, while 462 million are underweight. In 2020, 149 million children under five were stunted, 45 million wasted, and

38.9 million overweight or obese. Under-nutrition is linked to approximately 45% of deaths in children under five, predominantly in low and middle-income countries [1].

In India, Under-nutrition remains a major challenge, with one in three malnourished children worldwide living there [13]. India ranks 107th of 121 countries in the 2022 Global Hunger Index, with a serious hunger level and over half of under-five deaths linked to Under-nutrition [14,15].

NFHS-5 (2019–21) reports improvements compared to NFHS-4 (2015–16) in stunting, wasting, and underweight, particularly in Rajasthan, yet prevalence remains high. Madhya Pradesh has the highest malnutrition rate (55%) and national stunting and wasting rates exceed global averages by 9% and 8%, respectively[16,17]. India's Integrated Child Development Services (ICDS) program serves over 82 million children, but 36% remain underweight, 38% stunted, and 21% wasted after 45 years [18].

Under-nutrition has lasting effects on physical and cognitive development and increases susceptibility to diseases such as diarrhea, measles, malaria and respiratory infections[19]. Proper nutrition in the first 1,000 days of life is critical, and maternal nutrition is vital for preventing early childhood malnutrition [20,21]. The aim of this study is to describe Clinical and Socio-demographic profile and their association with malnourishment, in admitted malnourished children under 5 years of age at tertiary care hospital attached to Medical College, Rajasthan, India.

## Methodology:

**Ethics Clearance:** Approval from institutional Research Review Board (RRB) and Ethics Committee of Medical College, Rajasthan, India.

**Study design and participants:** This institution based cross sectional descriptive study was carried out at tertiary care hospital attached to Medical College, between April 2023 to December 2023. The participants were admitted malnourished children under 5 years recruited by convenience sampling. The study was



approved by the Institutional Research Review Board (RRB) and the Ethics Committee of concerned Medical College.

The inclusion criteria: (1) Children whose Parents/Guardian were give assent for the study.

The exclusion criteria: (1) Children under 5 years of age with other disease leading to Malnourishment (2) Children under 5 years of age admitted at intensive care unit

#### Questionnaire:

A validated, semi-structured questionnaire was used for data collection. The questionnaire was divided into three main sections: Section A- socio-demographic details of the patient includes family characteristics and family composition, Section B- history of malnourished children, focused on maternal and child health history relevant to malnutrition, Section C- clinical profile of the malnourished child.

#### The formula:

$$n=(Z_{1-\alpha/2}/\delta)^2 \times p \times (1-p)$$

Used to calculate the sample size where, “n” represents the sample size, “α” represents the type I error, which is typically set at 0.05,  $Z_{1-\alpha/2} = 1.96$ , study power of 80 %, δ represents the allowable error, typically set at 0.05, and “p” is prevalence of moderate acute malnutrition being 21.4% according to seed article [22]. The required sample size is 258 which was further enhanced and rounded off to 310 as final sample size to allow 20% attrition.

#### Statistical analysis:

Data collected were entered in Microsoft Excel Sheet by investigator himself on same day so as to minimize data entry bias if any. Statistical analysis was performed using IBM SPSS Statistics version 25. Frequency tables, charts, and mean ± standard deviation (SD) were created using descriptive statistics. The continuous variables were presented as mean ± standard deviation

(SD). Categorical variables were expressed as proportion and percentages. Chi-square test used to found association between socio-demographic characteristics and degree of malnutrition of study participants. P value <0.05 were taken as significant.

**Data Collection Procedure:** All admitted malnourished children under 5 Years of age during the period of April 2023 to December 2024 was taken under study. After building the rapport with Caregivers, they were approached and briefed by the researcher on the nature and purpose of the study. Aim and objective of the planned study was clearly explained to each caregiver (Mother/Father/others). All caregiver were asked to provide assent and informed consent obtained from parents or guardians. If a caregiver did not want to participate no pressure or coercion was made on them during the study, the next caregiver was approached and recruitment continued until sample size achieved. Children who were too sick to participate and those admitted to the intensive care unit were excluded. Data collection was done on pre-decided two days of week (Wednesday and Friday) and relevant data were collected for 6 cases per day on first come first serve basis till the sample size achieved.

#### OBSERVATION AND RESULTS:

Among 310 malnourished children, males constituted a higher proportion 177 (57.10%) than females 133 (42.90%). Table no. 1 shows that mean age was 15.46 months, with a standard deviation of 12.60 months. Most children 195 (62.91%) were between 7–24 months old, with the majority residing in rural areas 210 (67.74%) and belonging to the Hindu religion 219 (70.65%). A significant portion of mothers were illiterate 106 (34.19%), while most fathers had primary or middle school education 112 (36.13%). The majority of mothers were homemakers 271 (87.42%) and most fathers were self-employed 186 (60%). Over half the participants belonged to joint families 171 (55.16%) and 198 (63.87%) fell into the upper-lower socioeconomic class according to the Modified Kuppuswamy Scale (Feb 2023).

Socio-demographic Characteristics	Category	No.(%)
Gender	Male	177 (57.10%)



	Female	133 (42.90%)
<b>Age of child (In months)</b> Mean Age - 15.46 ±12.60 Month	0-6	58 (18.71%)
	7 to 24	195 (62.90%)
	25- 60	57 (18.39%)
<b>Residence</b>	Rural	210 (67.74%)
	Urban	100 (32.26%)
<b>Religion</b>	Hindu	219 (70.65%)
	Muslim	89 (28.71%)
	Others	2 (0.65%)
<b>Mother's education status</b>	Illiterate	106 (34.19%)
	Primary / middle	95 (30.65%)
	10 <sup>th</sup> / 12 <sup>th</sup> pass	72 (23.23%)
	Graduate	33 (10.65%)
	Not applicable	4 (1.29%)
<b>Father's education status</b>	Illiterate	51 (16.45%)
	Primary / middle	112 (36.13%)
	10 <sup>th</sup> / 12 <sup>th</sup> pass	78 (25.16%)
	Graduate	65 (20.97%)
	Not applicable	4 (1.29%)
<b>Occupational status of the mother</b>	Home maker	271 (87.42%)
	Self employed	32 (10.32%)
	Private job	3 (0.97%)
	Not Applicable	4 (1.29%)
<b>Occupational status of the father</b>	Home maker	16 (5.16%)
	Government job	2 (0.65%)
	Private job	102 (32.90%)
	Self employed	186 (60.00%)
	Not Applicable	4 (1.29%)
<b>Type of family</b>	Nuclear	81 (26.13%)
	Joint	171 (55.16%)
	Three Generation	58 (18.71%)
<b>Socio-economic class (Modified Kuppusswamy)</b>	Upper (I)	0 (0.00%)



<b>SES scale Feb. 2023)</b>	Upper Middle (II)	10 (3.23%)
	Lower Middle (III)	18 (5.81%)
	Upper Lower (IV)	198 (63.87%)
	Lower (V)	84 (27.10%)
<b>Total</b>		<b>310 (100.00%)</b>
<b>Table No. 1 showing Socio-demographic characteristics of malnourished children</b>		

Table no. 2 shows that most mothers 213 (68.71%) had 1–2 previous live births. A history of abortion was present in 66 (21.3%) of cases. Regarding maternal immunization, 232 (74.84%) of mothers received the complete two-dose Td schedule during pregnancy. Antenatal history, 172 (55.49%) of mothers completed

four or more antenatal visits and majority of children 256 (82.58%) were delivered at term while 37 (11.94%) were preterm. Institutional deliveries accounted for 292 (94.19%) of all births and among them 249 (80.32%) registered at Anganwadi centers.

<b>Antenatal History</b>	<b>Category</b>	<b>No.(%)</b>
<b>Number of pregnancy</b>	1 to 2	173 (55.81%)
	3 to 4	100 (32.26%)
	>5	37 (11.94%)
<b>Number of Live birth</b>	1 to 2	213 (68.71%)
	3 to 4	79 (25.49%)
	>5	18 (5.81%)
<b>H/o Abortions</b>	Yes	66 (21.30%)
	No	244 (78.71%)
<b>Vaccination during pregnancy</b>	Td1	14 (4.51%)
	Td2	232 (74.84%)
	Td booster	54 (17.42%)
	Not taken	10 (3.22%)
<b>Antenatal visits</b>	No Visit	3 (0.97%)
	1 to 3	135 (43.55%)
	≥4	172 (55.49%)
<b>Gestation period</b>	Pre term	37 (11.94%)
	Full term	256 (82.58%)



	Post term	17 (5.49%)
<b>Delivery place</b>	Institutional	292 (94.19%)
	At Home	18 (5.81%)
<b>Registered at Anganwadi Centre</b>	Yes	249 (80.32%)
	No	61 (19.68%)
<b>Total</b>		<b>310 (100.00%)</b>

**Table No. 2 showing antenatal history of mother of malnourished children**

Table 3 highlights that 123 (39.68%) of malnourished children had a normal birth weight, while a larger proportion, 145 (46.77%), were identified as having low birth weight (LBW). In terms of immunization coverage, children 213 (68.71%) were fully vaccinated according to national immunization records, whereas

children 83 (26.77%) had not received any vaccinations. Additionally, children 128 (41%) had been administered iron and folic acid syrup under the National Iron Plus Initiative (NIPI), and children 49 (16%) had received Albendazole through the National Deworming Program.

<b>Distribution of malnourished children as per h/o birth weight, vaccination and other supplements</b>		<b>No.</b>	<b>%</b>
<b>Birth weight</b>	Normal BW (> 2.5 kg – 4 kg)	123	39.68%
	LBW (1.5 -2.5 kg)	145	46.77%
	VLBW (1 – 1.5 kg)	22	7.10%
	ELBW (<1kg)	5	1.61%
	Don't know	15	4.84%
<b>History of vaccination</b>	Complete	213	68.71%
	Partial/ Incomplete	14	4.52%
	Never	83	26.77%
<b>IFA syrup under NIPI program (6 month to 5 year)</b>	Yes	128	41%
	No	168	54%
	Less per age	14	5%
<b>Albendazole Under National Deworming Program (respective ages)</b>	Yes	49	16%
	No	189	61%
	Less per age	72	23%
<b>Total</b>		<b>310</b>	<b>100.00%</b>

**Table No. 3 showing distribution of malnourished children as per h/o birth weight, vaccination and other**



supplements

Figure 1 showing distribution of patients as per severity of malnutrition. About 62 (20%) patients were have moderate acute malnutrition while 80% were belongs to severe Acute malnutrition.

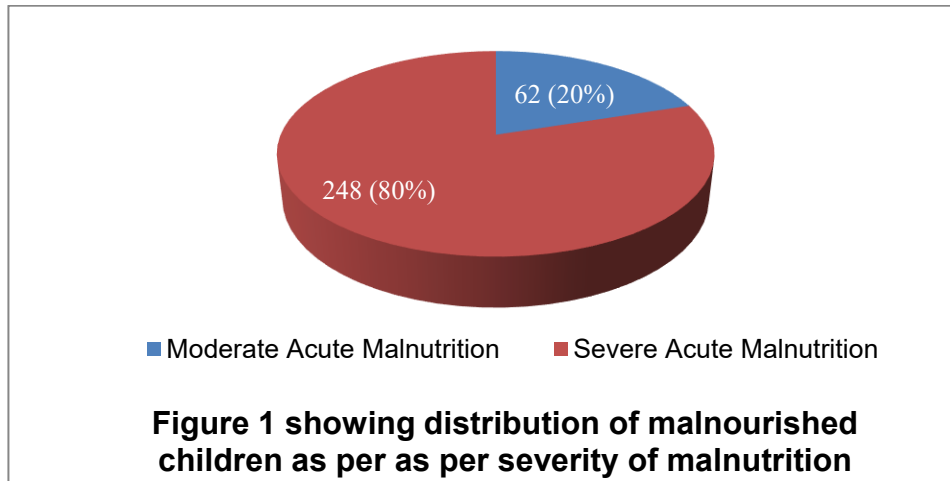


Figure 2 showing distribution of patients as per indicators of malnutrition. About 245 (79%) malnourished children were had severe underweight, 248 (80%) had severely wasted and 163 (53%) were severely stunted.

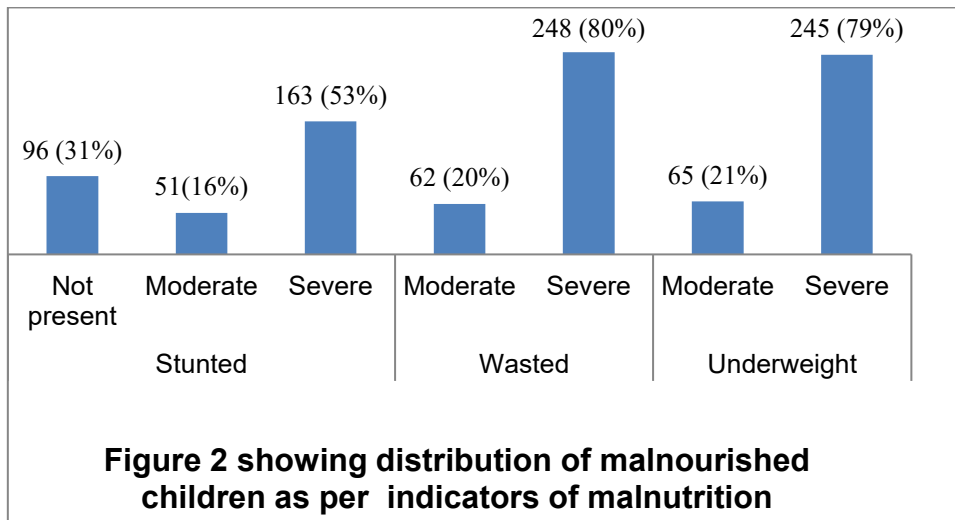


Table no. 4 showing distribution of malnourished children as per treatment received, duration of hospital stay and clinical outcome. Among the MAM patients, 43.55% received symptomatic treatment and 56.5% were provided with SAM supplements. Blood transfusions were administered to 30.65% of MAM patients, while 6.45% received fresh frozen plasma (FFP). For SAM patients, 14.11% received symptomatic treatment, while a majority (85.89%) were

given SAM supplements. Blood transfusions were performed in 26.61% of SAM patients.

Average hospital stay of the Malnutrition Children were  $10.3 \pm 10.90$  days and 25 (40.32%) MAM patients stay up to 5 days in hospital as compared to SAM patients in which majority 97 (39.11%) were stay between 6-10 days.



About 53 (85.48%) MAM patients and 208 (83.87%) SAM patients were discharged with improvement or in

stable condition.

Severity of malnutrition		MAM (62)	SAM (248)	Total (310)
		No. (%)	No. (%)	No. (%)
Treatment Received	Symptomatic and routine treatment	27 (43.55%)	35 (14.11%)	62 (20.00%)
	SAM supplements given	35 (56.45%)	213 (85.89%)	248 (80.00%)
	Blood transfusion given	19 (30.65%)	66 (26.61%)	85 (27.42%)
	FFP given	4 (6.45%)	4 (1.61%)	8 (2.58%)
Duration of stays	Up to 5 days	25 (40.32%)	83 (33.47%)	108 (34.84%)
	6- 10 days	17 (27.42%)	97 (39.11%)	114 (36.77%)
	11-15 days	8 (12.90%)	26 (10.48%)	34 (10.97%)
	More than 15 days	8 (12.90%)	31 (12.50%)	39 (12.58%)
	Died during treatment	4 (6.45%)	11 (4.44%)	15 (4.84%)
Clinical Outcome	Discharge with improvement or in stable condition	53 (85.48%)	208 (83.87%)	261 (84.20%)
	Not stable	1 (1.61%)	17 (6.85%)	18 (5.80%)
	LAMA/DOR/Abscond	3 (4.84%)	11 (4.44%)	14 (4.52%)
	Died during treatment	4 (6.45%)	11 (4.44%)	15 (4.84%)
	Lost to follow up	1 (1.61%)	1 (0.40%)	2 (0.64%)

**Table No. 4** showing distribution of malnourished children as per treatment received, duration of hospital stay and clinical outcome

## DISCUSSION

The present study was designed to describe Clinico-Sociodemographic profile of malnourished children under 5 years of age admitted at tertiary care hospital attached to Medical College, Rajasthan, India. In the present study, 57.1% of malnourished under-5 children were male, consistent with studies by Choudhary M et al.[23] and Najjar BA et al. [24], likely due to societal healthcare-seeking preferences. The majority (62.91%) were aged 7–24 months, aligning with Itaka MB et al. [25], emphasizing vulnerability during weaning. Rural children (67.74%) were more affected, similar to Najjar BA et al. [24], due to lower hygiene and awareness.

Most participants were Hindu (70.65%), which agrees with Bhadoria A et al. [26]. 97.76% of parents were married/living together, as also seen in Itaka MB et al.[25]. 93% of mothers were aged 15–35, in line with Bhadoria A et al. [26]. Around one-third of mothers were illiterate or had only primary/middle education, similar to Ahmad K et al. [27], though Najjar BA et al. [24] reported a higher illiteracy rate (64.26%).

About 80% of children had SAM, aligning with Itaka MB et al. [25], though Ahmad K et al. [27] found more non-malnourished cases. 82.58% of births were full-term, higher than Stalin P et al. [28], likely due to higher AWC utilization (80.32%).



Approx 46.77% had low birth weight, supporting Ahmad K et al. [27], though Itaka MB et al. [25] found lower LBW prevalence. 41% received IFA, higher than the 26% reported by Rai RK et al. [29] and only 16% received Albendazole, falling short of national deworming goals. 68.71% were fully vaccinated, lower than Bhadoria A et al. [26] (87%). 57.42% had calorie intake <80% of RDA, more so in SAM cases, supporting Priyanka R et al. [30] who linked poor intake with stunting. 69.03% were stunted, and all children were wasted, with 80% severe, far higher than NFHS-5 (19.3%), due to the hospital-based study population. Mathur Alka et al. [22] reported lower rates due to studying all under-five inpatients, not just malnourished ones. Treatment-wise, 56.5% of MAM and 85.89% of SAM patients received SAM supplements. Blood transfusions were more frequent in MAM (30.65%) than SAM (26.61%). 85.48% of MAM and 83.87% of SAM improved, with mortality around 5–6% in both groups. Average hospital stay was  $15.3 \pm 10.90$  days. After reviewing various article, no study found which studied these variable in relation to malnutrition for comparison.

**Limitations:** While the study offers valuable insights into the factors influencing childhood malnutrition, its limitations—such as cross-sectional design, sample biases, and gaps in data collection—restrict the ability to generalization of findings. Future detail research considering longitudinal studies with more diverse samples and deeper assessments of parental knowledge and nutritional practices. Addressing socio-economic factors and improving parental education through targeted interventions will be key in understanding and reducing malnutrition in the region.

**Conclusion:** A significant proportion of children were severely malnourished, with SAM being more prevalent than MAM. The findings point to alarming gaps in both healthcare delivery and nutritional support for malnourished children, with notable differences between the SAM and MAM groups. Despite a higher usage of iron-folic acid (IFA) syrup and Albendazole among MAM children, challenges remain in meeting adequate dietary needs and ensuring full vaccination coverage.

The study also underscores the role of socio-economic challenges—including poverty, living in rural areas, low maternal education, and socio-economic status—as

key contributors to the high prevalence of malnutrition. To effectively address the underlying causes of malnutrition, there is a pressing need for strategies focused on improving maternal education, promoting healthier care giving practices and increasing access to nutrition and hygiene education for families. Additional in-depth research is essential to evaluate the success of educational and community-based interventions in reducing malnutrition and its health consequences in this region.

**Informed consent:** Informed consent was taken from all before participating in study.

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**Conflict of interests:** The authors have no relevant financial or non-financial interests to disclose.

**Database Availability Statement:** Authors have datasheet available in Microsoft Excel, will be share if requested.

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