Section: Community Medicine

Original Research Article

A STUDY OF MORBIDITY PATTERN AMONG PAEDIATRIC POPULATION IN TRIBAL, RURAL AND URBAN AREAS OF GUNTUR DISTRICT

Supritha Sakhamuri[1], Chandrakala Kambar[2], Meenakshi Lella[3], Ummadi Venkata Nitish Reddy[1], Radha Kumari Paladugu[4], Kamalnatha Sai Sakhamuri[5]

[1]*MBBS Graduate, Guntur Medical College, Guntur, Andhra Pradesh, India.*
[2]*Professor and Head, Department of Pharmacology, Government Medical College, Ongole, Andhra Pradesh, India.*
[3]*Associate Professor, Department of Pharmacology, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India.*
[4]*Professor, Department of Community Medicine, Andhra Medical College, Vizag, Andhra Pradesh, India.*
[5]*Final MBBS Part II Student, Guntur Medical College, Guntur, Andhra Pradesh, India.*

Received *: 16/05/2026*
Received in revised form *: 13/07/2026*
Accepted *: 28/07/2026*

Corresponding Author:
Dr. Meenakshi Lella,
Associate Professor, Department of Pharmacology, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India.
Email: drmeenu81@yahoo.co.in

DOI:10.70034/ijmedph.2026.3.359

Source of Support: ICMR STS 2022 Project
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 2252-2260

ABSTRACT

Background: Morbidity patterns among paediatric population vary significantly across urban, rural, and tribal areas, due to differences in environmental factors, nutritional status, sanitation, parental education, and the availability of healthcare services. The aim and objective is to assess and compare pediatric morbidity across tribal, rural, and urban areas, identify associated risk factors, examine treatment-seeking behavior, and provide recommendations to improve child health.

Materials and Methods: A community-based, cross-sectional and observational study was conducted among children (0–12 years) in tribal, rural, and urban areas, with parental assent and Institutional Ethics Committee approval.

Results: Children in urban areas were mostly male (51.3%), while females predominated in rural (54.7%) and tribal (52%) areas. The 4–6 years' age group was most common in urban (26%) and rural (39.34%) areas, whereas tribal areas had more children aged 10–12 years (59.33%). Morbidity was present in 67.33% (urban), 80% (rural), and 92.67% (tribal) of children. Urban children mostly came from nuclear families (88%) with higher parental literacy and better socioeconomic status. Rural and tribal children had higher rates of underweight, oral issues, and stunting. Tribal children bore the highest burden of multiple morbidities, especially among those with illiterate mothers.

Conclusion: This study reveals significant differences in pediatric morbidity across tribal, rural, and urban areas. Reducing this burden requires improving maternal education, hygiene and nutrition awareness, and access to primary healthcare in rural and tribal regions. Targeted public health strategies are vital to addressing these disparities and advancing national child health.

Keywords: Morbidity, paediatric age, urban area, rural area, tribal area.

INTRODUCTION

Children form the foundation of a nation's future, and a mother's health plays a crucial role in determining a child's well-being. A child's health can be negatively impacted even before birth if the mother is malnourished, under the age of 18, or over 35. Additional factors influencing child health include family size, parental education and occupation, housing conditions, whether the family lives in an urban or rural area, and the level of industrialization in the community.

The early years of child life are critically important as this age is marked by accelerated growth and development. Any adverse influences during this period may result in severe limitations in their development, hence regular monitoring is required.[1] The occurrence, severity, and frequency of illness in infants and young children are influenced by feeding and caregiving practices, the

child's nutritional status, and the cleanliness of their environment.[2]

Children between 1-4 years of age are generally called pre-school-age children or toddlers. Their mortality is mostly due to infections and malnutrition which in turn results in stunted growth and make them vulnerable to infections. Protein-energy malnutrition (PEM) has been identified as a major nutritional problem among tribal children in India.[3] It is also associated with other nutritional deficiencies such as anaemia and xerophthalmia. The prevalence of anaemia in under 5years children is 58.6 %.[4] Nutritional Anaemia can be caused due to deficiencies of micronutrients such as Iron, Folic acid, and vitaminB12. Young children fall easy prey to infectious diseases such as diarrhoea, respiratory infections, measles, pertussis, polio, neonatal tetanus, intestinal parasitic infestations, tuberculosis, and diphtheria.

In India, the majority of the population migrated from rural to urban area and nearly one-fourth of them resides in urban slums.[5] This rapid increase in the slum population has a profound effect on their health due to poor housing conditions, overcrowding, lack of potable drinking water and sanitation facilities, and susceptible to a wide range of communicable and non-communicable diseases.[6] Children from tribal and rural areas suffer from a higher rate of morbidity than urban areas which can be due to decreased per capita per day calorie intake, illiteracy, poor hygiene, lack of safe drinking water, poor childhood vaccination, gender discrimination in the form of dietary negligence of female children.

In India, to improve the nutritional status of the population, various programmes have been launched over the years like Integrated Child Development Services(ICDS), Mid-Day Meal Programme, National Iodine Deficiency Disorders Control Programme (NIDDCP), and National Iron Plus Initiative (NIPI).Despite several health programmes, some of the rural, tribal, and difficult-to-reach areas of India are particularly lacking healthcare facilities and this has been recognized as one of the determinants of high morbidity in India. Therefore, this study was undertaken to assess and compare the different morbidities among children in the paediatric age group across tribal, rural, and urban areas; to identify associations between various risk factors and their morbidity profiles; to understand their treatment-seeking behavior during illness; and to provide guidance and recommendations for improving the health of paediatric-age children.

MATERIALS AND METHODS

A community-based, cross-sectional, house to house survey was carried outover two months between May and September 2022 among children of the paediatric age group (0-12years) living in tribal, rural, and urban areas of the Guntur district following approval from Institutional Ethics Committee (GMC/IEC/070/2022).

Sample size and sampling procedure:

It was calculated by taking the prevalence of malnutrition 45.9% from a previous study done by Vyas et al,[2] in preschool children in rural area of Dehradun.

Sample size calculation formula (n): 4PQ/L2.Allowable error (L) =20%., Q=100-P = 54.1%.

n= 4*45.9*54.1/9.18*9.18 = 117.86.

Thereby, the estimated sample size was rounded to 120 children. Considering a non-response rate of 10%, the final sample size was estimated to be 132, so a total sample size of 150 children was included from each area in the study.So a total of 450 children were taken into the study from tribal, rural, and urban areas.

Inclusion criteria: All children of the 0-12 years age group, accompanied by at least one of the parents on the day of data collection were included. Informed assent was taken from parents of participants.

Exclusion criteria: Pre-term newborns, children who were suffering from any chronic or severe illnesses, and children whose parents were not willing to participate were excluded.

Method of data collection: All the PHCs in tribal, rural, and urban areas were listed out and by using random number tables, one PHC from each area was selected for the study. Then one sub-center from each PHC was selected by a simple random method. One village/ ward from each sub-center was selected by lottery method. If the required sample size was not achieved from that village/ward, a subsequent village/ward was selected. In each village/ward, one house was selected by simple random technique and from that house, the right-hand rule was followed till the sample size was achieved. Data was collected by a house-to-house survey from children under the five age group accompanied by one of their parents with the help of selected investigators like Accredited social health activist (ASHA), Multipurpose health worker female, Anganwadi staff who were trained beforehand. Data were collected by interview technique and interpreted into a pre-tested, predesigned, semi-structured questionnaire. The questionnaire contained 4 parts:

- First part: Socio-demographic details including information regarding breastfeeding, source of water supply, the immunization status of the child.
- Second part: Questions related to malnutrition and anemia.
- Third part: Questions related to GI disorders like diarrhea and worm infestations.
- Fourth part: Questions related to skin diseases like measles.

➢ Anthropometric measurements - weight for age, and height for age were recorded for each child. It was calculated according to Waterlow's

classification of malnutrition,[7] [Table 1].

Table 1:Waterlow's Classification of Malnutrition				
	Normal	**Mild**	**Moderate**	**Severe**
Height for age (%)	>95	90-95	85-90	<85
Weight for age (%)	>90	75-90	60-74	<60

- For the study, morbidity was classified into three categories:
- Acute diarrhoeal disease- defined as at least 3 watery stools in 24hour period, is considered a new episode if there was a 48-hour symptom-free interval.
- Acute respiratory illness – defined as running nose/ cough either with/ without fever lasting for at least 72hours.
- Other morbidities- include a history of pica and worm infestations.

Data analysis: The data so collected was entered into the MS Excel spreadsheet. Data was represented in the form of figures and tables. Chi-square test and ANOVA weredone to test the significance of categorical variables. p value <0.05 was considered statistically significant.

RESULTS

Data was collected from a total of 450 children, 150 each from urban, rural, and tribal areas of the Guntur district.

Table 2: Demographic details of children:

Characteristics	**Frequency**		
	URBAN n(%)	**RURAL n(%)**	**TRIBAL n(%)**
GENDER:			
Male	77 (51.3%)	68 (45.3%)	72 (48%)
Female	73 (48.7%)	82 (54.7%)	78 (52%)
Total	150(100%)	150 (100%)	150 (100%)
AGE (in years):			
0-3	37 (24.67%)	44 (29.33%)	19 (12.67%)
4-6	39 (26%)	59 (39.34%)	16 (10.67%)
7-9	38 (25.33%)	29 (19.33%)	26 (17.33%)
10-12	36 (24%)	18 (12%)	89 (59.33%)
Total	150 (100%)	150 (100%)	150 (100%)
EDUCATION:			
Not yet started schooling	36 (24%)	43 (28.67%)	19 (12.67%)
Playschool	27 (18%)	44 (29.33%)	9 (6%)
Primary school	52 (34.67%)	51 (34%)	94 (62.66%)
Secondary school	35 (23.33%)	12 (8%)	28 (18.67%)
Total	150 (100%)	150 (100%)	150 (100%)
TYPE OF SCHOOL:			
Government	33 (22%)	66 (44%)	121 (80.66%)
Private	81 (54%)	41 (27.33%)	10 (6.67%)
None	36 (24%)	43 (28.67%)	19 (12.67%)
Total	150 (100%)	150 (100%)	150 (100%)
RELIGION:			
Hindu	78 (52%)	92 (61.33%)	116 (77.34%)
Christian	35 (23.33%)	43 (28.67%)	32 (21.33%)
Muslim	37 (24.67%)	15 (10%)	2 (1.33%)
Total	150 (100%)	150 (100%)	150 (100%)
SOCIO-ECONOMIC STATUS:			
Upper class	80 (53.33%)	16 (10.67%)	2 (1.33%)
Upper middle class	20 (13.33%)	15 (10%)	11 (7.33%)
Middle class	37 (24.67%)	77 (51.33%)	47 (31.33%)
Lower middle class	11 (7.34%)	38 (25.33%)	65 (43.34%)
Lower class	2 (1.33%)	4 (2.67%)	25 (16.67%)
Total	150 (100%)	150 (100%)	150 (100%)
TYPE OF FAMILY:			
Nuclear	132 (88%)	55 (36.67%)	94 (62.67%)
Three generation	7 (4.67%)	77 (51.33%)	4 (2.67%)
Joint	11 (7.33%)	18 (12%)	52 (34.66%)
Total	150 (100%)	150 (100%)	150 (100%)
Education status of parents			
Educated Fathers	135(90%)	121(80.67%)	81(54%)
Educated Mothers	136(90.67%)	131(87.33%)	78(52%)

As shown in [Table 2], females constituted the majority of children in rural (54.7%) and tribal (52%) areas, while males predominated in urban areas (51.3%). Most urban (26%) and rural (39.34%) children were aged 4–6 years; among them, 71.8% and 59.4% attended primary school,

respectively. In tribal areas, most children (59.33%) were aged 10–12 years, with 72% attending secondary school. Government school utilization was highest in tribal areas (80.66%), followed by rural (44%) and urban (22%) areas. According to the Kuppuswamy socioeconomic scale, most urban and rural children belonged to the upper and middle classes, respectively, while 43.34% of tribal children were from the lower-middle class. Nuclear families were more common in urban (88%) and tribal (62.67%) than rural (36.67%) areas. Overall, parental literacy was highest in the urban area.

Table 3: Distribution of birth-related characteristics of the study population

Characteristics	Frequency		
	URBAN n (%)	RURAL n (%)	TRIBAL n (%)
BIRTH WEIGHT:			
Normal	123 (82%)	96 (64%)	98 (65.33%)
Low birth weight	24 (16%)	50 (33.33%)	40 (26.67%)
Extremely low birth weight	3 (2%)	4 (2.67%)	12 (8%)
Total	150(100%)	150(100%)	150(100%)
BIRTH ORDER(BO):			
1	61 (40.67%)	81 (54%)	66 (44%)
2	68 (45.33%)	60 (40%)	56 (37.33%)
3	18 (12%)	9 (6%)	23 (15.34%)
≥4	3 (2%)	0 (0%)	5 (3.33%)
Total	150(100%)	150(100%)	150(100%)
DURATION OF PREGNANCY:			
Term	118 (78.67%)	137 (91.33%)	132 (88%)
Preterm	32 (21.33%)	13 (8.67%)	18 (12%)
Total	150(100%)	150(100%)	150(100%)
EXCLUSIVE BREASTFEEDING:			
<6 months	45 (30%)	52 (34.7%)	65 (43.4%)
≥6 months	105 (70%)	96(64%)	85 (56.6%)
No breastfeeding	0 (0%)	2 (1.3%)	0 (0%)
Total	150(100%)	150(100%)	150(100%)
IMMUNISATION:			
Fully immunized	5 (3.3%)	2 (1.3%)	1 (0.6%)
Completely immunized	140 (93.4%)	139 (92.7%)	145 (96.8%)
Partially immunized	5 (3.3%)	9 (6%)	4 (2.6%)
Unimmunized	0 (0%)	0 (0%)	0 (0%)
Total	150(100%)	150(100%)	150(100%)

As shown in [Table 3], the prevalence of low birth weight (1.5–2.5 kg) was highest in the rural area (33.33%), while extremely low birth weight (<1.5 kg) was most common in the tribal area (8%). Preterm delivery was more prevalent in the urban area (21.33%). Exclusive breastfeeding for ≥6 months was reported among 70%, 64%, and 56.6% of children in urban, rural, and tribal areas, respectively. Difficulty in breastfeeding due to cleft lip was reported in 1.3% of rural children. Complete immunization coverage was high across all areas, with 93.4% in urban, 92.7% in rural, and 96.8% in tribal areas.

As represented in [Figure 1], most of the children (92.67%)from the tribal areas had one or the other morbidity.

Prevalence of morbidity:

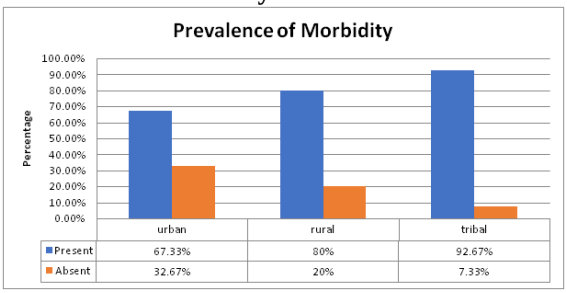

Figure 1: Prevalence of morbidity among the study population.

Table 4: Distribution of weight for age among the study population according to Waterlow classification

Weight for age:	Frequency (%)		
	URBAN n (%)	RURAL n (%)	TRIBAL n (%)
Overweight	14 (9.33%)	23 (15.33%)	12 (8%)
Normal	87 (58%)	34 (22.67%)	41 (27.33%)
Grade 1	18 (12%)	26 (17.33%)	41 (27.33%)
Grade 2	21 (14%)	36 (24%)	35 (23.34%)
Grade 3	10 (6.67%)	31 (20.67%)	21 (14%)
Total	150 (100%)	150 (100%)	150 (100%)

x2= 59.8, df= 8, p<0.0001

As shown in [Table 4], normal weight-for-age was most prevalent among urban children (58%), whereas undernutrition was considerably higher in rural and tribal areas. Grade 1 underweight was

most common in the tribal area (27.33%), while Grade 2 (24%) and Grade 3 (20.67%) underweight were highest in the rural area, indicating more severe malnutrition. Overweight was observed more frequently among rural children (15.33%) compared to urban (9.33%) and tribal (8%) children. The association between area of residence and weight-for-age status was statistically highly significant.

Table 5: Distribution of height for age among the study population according to Waterlow classification

Height for age:	Frequency (%)		
	Urban n (%)	Rural n (%)	Tribal n (%)
Normal	65 (43.33%)	71 (47.33%)	74 (49.33%)
Grade 1	44 (29.33%)	33 (22%)	39 (26%)
Grade 2	31 (20.67%)	29 (19.34%)	20 (13.34%)
Grade 3	10 (6.67%)	17 (11.33%)	17 (11.33%)
Total	150 (100%)	150 (100%)	150 (100%)

x2= 6.971, df=6,p>0.05

As mentioned in [Table 5], chronic undernutrition according to height for age was found to be high in the urban area (56.67%). The prevalence of grade-3 chronic undernutrition was found to be high in rural (11.33%) and tribal (11.33%) children but the results were not found to be statistically significant.

Table 6: Morbidity pattern among the study population

Characteristics	Frequency		
	URBAN n (%)	RURAL n (%)	TRIBAL n (%)
Clinical Pallor	58 (38.6%)	68 (45.3%)	78 (52%)
Hair problems	14 (9.3%)	22 (14.6%)	57 (37.9%)
Dyspigmented	6 (4%)	12 (8%)	22 (14.6%)
Loss of luster	2 (1.33%)	6 (4%)	26 (17.3%)
Thin and sparse	6 (4%)	4 (2.66%)	9 (6%)
Ophthalmic problems	20 (13.3%)	15 (10%)	18 (12%)
Refractory error	18 (12%)	11 (7.33%)	10 (6.66%)
Bitot's spots	2 (1.3%)	3 (2%)	8 (5.3%)
Drooping of eyelid	0 (0%)	1 (0.66%)	0 (0%)
Oral problems	46 (30.5%)	73 (48.6%)	127 (84.6%)
Pale and flabby	6 (4%)	22 (14.6%)	48 (32%)
Caries	30 (20%)	36 (24%)	47 (31.3%)
Mottled enamel	2 (1.3%)	4 (2.6%)	20 (13.3%)
Yellowing	4 (2.6%)	4 (2.6%)	12 (8%)
Attrition	0 (0%)	3 (2%)	0 (0%)
Cheilosis	4 (2.6%)	2 (1.33%)	0 (0%)
Cleft lip	0 (0%)	2 (1.33%)	0 (0%)
Rachitic changes	1 (0.66%)	2 (1.3%)	1 (0.66%)
Worm infestations	19 (12.6%)	22 (14.6%)	34 (22.6%)
Habit of pica	12 (8%)	22 (14.6%)	20 (13.3%)

As mentioned in [Table 6], the common types of morbidity among the study population in all three areas were found to be clinical pallor, ophthalmic problems, hair problems, and worm infestations. The majority of children in rural (48.6%) and tribal areas (84.6%) were found to have a high prevalence of oral problems in contrast to clinical pallor in urban area (38.6%).

Table 7: Distribution of morbidity pattern among the study population in the past one month

Characteristics	Frequency		
Illnesses in the past 1 month	URBAN n (%)	RURAL n (%)	TRIBAL n (%)
Gastrointestinal illnesses	30 (20%)	24 (16%)	36 (24%)
Diarrhea	15 (10%)	12(8%)	21 (14%)
Vomiting	12 (8%)	6 (4%)	9 (6%)
Mesenteric lymphadenopathy	3 (2%)	6 (4%)	6 (4%)
Respiratory illnesses	24 (16%)	27 (18%)	48 (32%)
Cold and cough	15 (10%)	21 (14%)	40 (26.66%)
Asthma	6 (4%)	4 (2.66%)	3 (2%)
Pneumonia	3 (2%)	2 (1.33%)	5 (3.33%)
Skin problems	17 (11.2%)	14 (9.3%)	75 (50%)
Allergy	9 (6%)	6 (4%)	6 (4%)
Hypo-pigmented patches	3 (2%)	3 (2%)	7 (4.6%)
Dry and scaly skin	2 (1.3%)	2 (1.33%)	6 (4%)
Scabies	1 (0.66%)	2 (1.33%)	18 (12%)
Pediculosis	2 (1.33%)	1 (0.66%)	38 (25.3%)
Other illnesses	25 (16.67%)	32 (21.3%)	30 (20%)
Fever	21 (14%)	26 (17.3%)	18 (12%)
Typhoid	4 (2.66%)	6 (4%)	7 (4.6%)

Dengue	(0%)	(0%)	1 (0.66%)
Malaria	(0%)	(0%)	1 (0.66%)
Jaundice	(0%)	(0%)	2 (1.33%)
Tonsilitis	(0%)	(0%)	1 (0.66%)

As mentioned in table 7, the prevalence of skin problems in tribal area was found to be 50% among which pediculosis (25.3%) was found to be high whereas in urban and rural areas gastrointestinal illnesses (20%) and other illnesses (16.67%) like fever and typhoid were more common respectively. The prevalence of respiratory illnesses was found to be high in tribal (32%) children when compared to urban (16%) and rural (18%) children.

As represented in [Figure 2], most of the children from the urban, rural and tribal areas had at least one episode of typhoid since birth respectively.

Distribution of exanthematous fevers among study population:

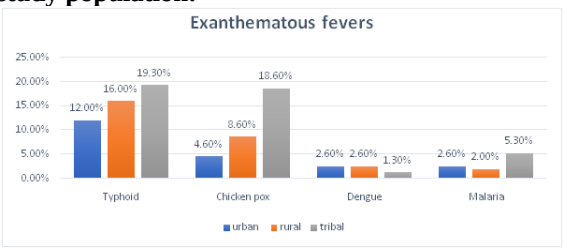

Figure 2: Distribution of exanthematous fevers since birth among the study population.

Table 8: Distribution of morbidity pattern among the study population as per the Education status of the mother.

Morbidity	Education status of the mother	Urban n (%)	Rural n (%)	Tribal n (%)
Pallor	Literate	46 (79.3%)	54 (79.4%)	30 (38.5%)
	Illiterate	12 (20.7%)	14 (20.6%)	48 (61.5%)
Ophthalmic problems	Literate	19 (95%)	10 (66.6%)	7 (38.9%)
	Illiterate	1 (5%)	5 (33.3%)	11 (61.1%)
Oral problems	Literate	38 (82.6%)	57 (78.1%)	59 (46.4%)
	Illiterate	8 (17.4%)	16 (21.9%)	68 (53.6%)
Hair problems	Literate	6 (42.9%)	9 (40.9%)	20 (35.1%)
	Illiterate	8 (57.1%)	13 (59.1%)	37 (64.9%)
Rachitic changes	Literate	1 (100%)	1 (50%)	1 (100%)
	Illiterate	0 (0%)	1 (50%)	0 (0%)
Worm infestations	Literate	14 (73.7%)	16 (72.7%)	12 (35.3%)
	Illiterate	5 (26.3%)	6 (27.3%)	22 (64.7%)
Pica	Literate	7 (58.33%)	14 (63.6%)	8 (40%)
	Illiterate	5 (41.66%)	8 (36.4%)	12 (60%)
Gastrointestinal illnesses	Literate	25 (83.33%)	15 (62.5%)	12 (33.33%)
	Illiterate	5 (16.66%)	9 (37.5%)	24 (66.66%)
Respiratory illnesses	Literate	20 (83.33%)	20 (74.1%)	22 (45.8%)
	Illiterate	4 (16.66%)	7 (25.9%)	26 (54.2%)
Skin problems	Literate	12 (70.6%)	7 (50%)	31 (41.33%)
	Illiterate	5 (29.4%)	7 (50%)	44 (58.67%)
Other illnesses	Literate	20 (80%)	20 (62.5%)	12 (40%)
	Illiterate	5 (20%)	12 (37.5%)	18 (60%)
Exanthematous illnesses	Literate	27 (81.8%)	33 (75%)	31 (46.3%)
	Illiterate	6 (18.2%)	11 (25%)	36 (53.7%)

As mentioned in table 8, morbidities like pallor, ophthalmic problems, pica, oral problems, worm infestations, and skin problems were found to be high among children of illiterate mothers of the tribal area when compared to urban and rural areas. Overall there is no significant relation between the morbidity pattern and literacy status of mothers($p>0.05$).

Table 9: Distribution of morbidity among the study population as per Socioeconomic status

Morbidity	Socio-economic status	Urban n (%)	Rural n (%)	Tribal n (%)
1.Pallor	Upper class	29 (50%)	7 (10.3%)	0 (0%)
	Upper middle class	8 (13.8%)	6 (8.8%)	3 (3.8%)
	Middle class	15 (25.9%)	32 (47%)	21 (26.9%)
	Lower middle class	5 (8.6%)	21 (30.9%)	36 (46.2%)
	Lower class	1 (1.7%)	2 (2.9%)	18 (32%)
2. Ophthalmic problems	Upper class	14 (70%)	1 (6.6%)	1 (5.6%)
	Upper middle class	1 (5%)	0 (0%)	4 (22.2%)
	Middle class	1 (5%)	7 (46.6%)	3 (16.6%)
	Lower middle class	2 (10%)	6 (40%)	6 (33.3%)
	Lower class	2 (10%)	1 (6.6%)	4 (22.2%)
3. Oral problems	Upper class	15 (32.6%)	6 (8.2%)	1 (0.8%)
	Upper middle class	7 (15.2%)	5 (6.8%)	8 (6.3%)
	Middle class	14 (30.4%)	34 (46.6%)	39 (30.7%)
	Lower middle class	8 (17.4%)	25 (34.2%)	57 (44.9%)
	Lower class	2 (4.3%)	3 (4.1%)	22 (17.3%)
4. Hair problems	Upper class	4 (28.6%)	0 (0%)	1 (1.8%)

	Upper middle class	1 (7.1%)	1 (4.6%)	4 (7%)
	Middle class	4 (28.6%)	12 (54.5%)	18 (31.6%)
	Lower middle class	3 (21.4%)	6 (27.3%)	23 (40.3%)
	Lower class	2 (14.3%)	3 (13.6%)	11 (19.3%)
5. Rachitic changes	Upper class	1 (100%)	0 (0%)	0 (0%)
	Upper middle class	0 (0%)	1 (50%)	1 (100%)
	Middle class	0 (0%)	0 (0%)	0 (0%)
	Lower middle class	0 (0%)	0 (0%)	0 (0%)
	Lower class	0 (0%)	1 (50%)	0 (0%)
6. Worm infestations	Upper class	8 (42.1%)	2 (9%)	1 (2.9%)
	Upper middle class	5 (26.3%)	3 (13.6%)	2 (5.9%)
	Middle class	1 (5.3%)	6 (27.3%)	5 (14.7%)
	Lower middle class	3 (15.7%)	6 (27.3%)	14 (41.2%)
	Lower class	2 (10.5%)	5 (22.7%)	12 (35.3%)
7. Habit of pica	Upper class	6 (50%)	3 (13.6%)	0 (0%)
	Upper middle class	1 (8.33%)	2 (9%)	1 (5%)
	Middle class	1 (8.33%)	7 (31.8%)	4 (20%)
	Lower middle class	2 (16.67%)	5 (22.7%)	7 (35%)
	Lower class	2 (16.67%)	5 (22.7%)	8 (40%)
8. Exanthematous fevers	Upper class	20 (60.6%)	5 (11.4%)	1 (1.5%)
	Upper middle class	5 (15.2%)	7 (15.9%)	3 (4.5%)
	Middle class	4 (12.1%)	19 (43.2%)	15 (22.4%)
	Lower middle class	3 (9%)	11 (25%)	31 (46.2%)
	Lower class	1 (3%)	2 (4.5%)	17 (25.4%)
9. GI illnesses	Upper class	16 (53.3%)	4 (16.67%)	2 (5.5%)
	Upper middle class	4 (13.3%)	1 (4.2%)	4 (11.1%)
	Middle class	4 (13.3%)	10 (42%)	12 (33.3%)
	Lower middle class	4 (13.3%)	4 (16.67%)	6 (16.6%)
	Lower class	2 (6.6%)	5 (20.8%)	12 (33.3%)
10. Respiratory illnesses	Upper class	15 (62.5%)	3 (11.1%)	1 (2.1%)
	Upper middle class	4 (16.6%)	3 (11.1%)	6 (12.5%)
	Middle class	2 (8.3%)	11 (40.7%)	11 (22.9%)
	Lower middle class	2 (8.3%)	8 (29.6%)	9 (18.7%)
	Lower class	1 (4.2%)	2 (7.4%)	21 (43.8%)
11. Skin diseases	Upper class	2 (11.8%)	2 (14.3%)	1 (1.3%)
	Upper middle class	4 (23.5%)	2 (14.3%)	4 (5.3%)
	Middle class	5 (29.4%)	2 (14.3%)	10 (13.3%)
	Lower middle class	4 (23.5%)	4 (28.6%)	18 (24%)
	Lower class	2 (11.8%)	4 (28.6%)	42 (56%)
12. other illnesses	Upper class	12 (48%)	6 (18.7%)	1 (3.3%)
	Upper middle class	4 (16%)	2 (6.2%)	4 (13.3%)
	Middle class	3 (12%)	12 (37.5%)	7 (23.3%)
	Lower middle class	4 (16%)	10 (31.3%)	6 (20%)
	Lower class	2 (8%)	2 (6.3%)	12 (40%)

As mentioned in [Table 9], in all areas, morbidities like pallor, ophthalmic problems, oral problems, and exanthematous fevers were more prevalent among the upper, middle, and lower middle classes of socio-economic status respectively. In tribal area, morbidities like skin diseases, a habit of pica, and respiratory illnesses were found to be more prevalent among the lower class of socio-economic status.

Latency in approach towards medication:

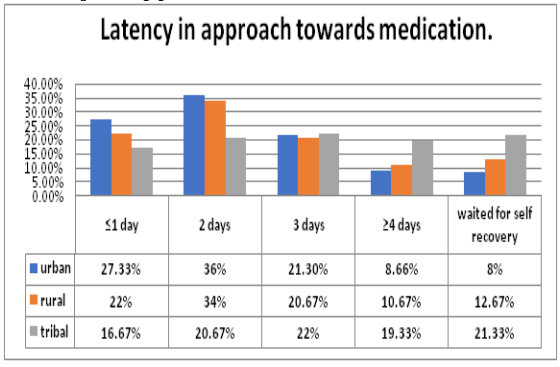

Figure 3: Distribution of study population based on latency in approach towards medication.

As represented in [Figure 5], In urban (36%) and rural areas (34%) latency in approach towards medication was found to be 2 days whereas in the tribal area (22%) it was found to be 3 days. In tribal area, 21.33% waited for self-recovery.

Approachment to type of healthcare facility:

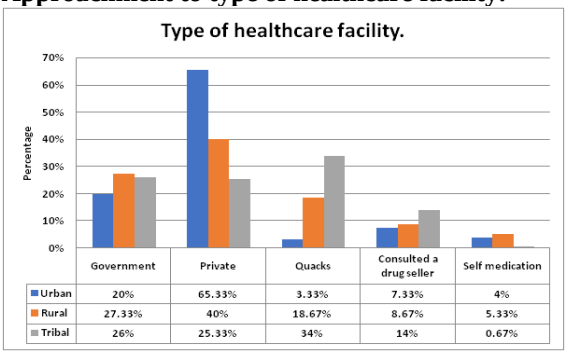

Figure 4: Distribution of study population based on the type of healthcare facility approached upon arousal of symptoms.

As represented in [Figure 4], in urban (65.33%) and rural areas (40%), private healthcare facility was

utilized whereas in the tribal area (34%) approached quacks.

DISCUSSION

The present study was conducted among 450 children, 150 each from urban, rural, and tribal areas of the Guntur district of paediatric age group (0-12years) to study the morbidity pattern in this age group. The study also focused on education, occupation, socio-economic status of parents, treatment-seeking behavior during illness, and other resources.

In the present study, female children were predominant in rural (54.7%) and tribal (52%) areas which shows that there is improvement in the sex ratio in these areas. Similar findings were seen in the study by Gokhale et al,[8] among primary school children in a tribal area of Maharashtra, female children were found to be predominant (54%).

Stunting was found to be the most common morbidity in the urban area (56.67%) and the prevalence of underweight was also found to be high (32.67%). Similar to this study, Palash Das et al,[9] found the prevalence of underweight to be 31.10% and Neeti Verma et al,[10] found it to be 26.8%. Another study done by Ajeet Singh et al,[11] in the urban slums of Delhi found that 37.5% of children were underweight and 39% were stunted.

In the rural area, underweight was the most common morbidity (62%) and the prevalence of stunting was found to be 52.67% which in turn was found to be 71% and 44.6% in a study done by R. Maheshwaran et al,[12] in high school children in rural South India.

In tribal area, the prevalence of underweight and stunting was found to be 64.66% and 50.67% respectively. Similar to our study, VG. Rao et al,[13] in their study in tribal preschool children found underweight to be 61.6% and stunting to be 51.6%. Underweight was highly prevalent among tribal children when compared to urban and rural children which might be attributed to low socio-economic status, poor child rearing, and illiteracy. This shows that despite having so many nutritional programs, still undernutrition was found to be high in children which is a major cause of mortality and morbidity among them.

In our study, Pallor was one of the leading causes of morbidity in all three areas. A higher proportion of pallor in children of the tribal area (52%) might be due to low socioeconomic status, and illiteracy of mothers. In a similar study done by Chandrasekhar et al,[14] done among rural, urban, and tribal government residential hostel children of East Godavari district the prevalence of anemia was more in urban (70.5%) compared to rural (65.5%) and tribal areas (63.7%) which were found to be high when compared to the present study.

In the present study, oral problems were the leading cause of morbidity in tribal children (84.6%). Dental caries was a very common problem in all three areas of the children. Lack of knowledge about dental hygiene, inadequate personal and oral hygiene, more number of children in the family, poverty, and illiteracy may be the factors responsible for the predominance of oral problems in the tribal area. This is in contrast to a study done by Chandrasekhar et al,[14] where the prevalence of dental caries was slightly more in rural children (19.1%) compared to urban (18.3%) and tribal (18.4%) areas.

In our study, ophthalmic problems were predominant in urban children (13.3%) compared to rural (10%) and tribal (12%) children. Environmental factors and vitamin A deficiency might be the reason for the predominance of refractory errors in urban children. Present study results were comparable with Chandrasekhar et al,[14] study with a prevalence of refractory errors in the urban area (18.3%) compared to 11.4% in rural and only 4.7% of tribal children.

Skin diseases in urban, rural, and tribal areas in our study were found to be 11.2%, 9.3%, and 50% respectively. This variability could be attributed to poor environmental sanitation and unhygienic personal habits which predisposes them to the risk of skin diseases. In contrast to our study, Nitin Saluja et al,[15] in urban, Monika Kohli et al,[16] in rural, and Virendra Kumar et al,[17] in tribal, found the prevalence to be 59%, 48.3%, and 24% respectively.

The prevalence of diarrhea in our study in urban, rural, and tribal areas was found to be 10%, 8%, and 14% respectively. Studies done by Neeti Verma et al,[10] A. Meriton Stanly et al,[18] and Venkatashiva Reddy B. et al,[19] showed the prevalence of diarrhea to be 2.6%, 22.5%, and 21.4% respectively. This shows that there is a need for further improvement in sanitation, and personal hygiene by conducting intensive health promotion in the community.

In our study prevalence of respiratory illnesses was found to be 16%, 18%, and 32% respectively. This could be attributed to poor ventilation, overcrowding, and indoor air pollution. A study by Sujata Murarkar et al,[20] in rural and urban areas in western Maharasthra showed prevalence to be 54.2% and 46.7% respectively. A study in tribal area by Venkatashiva Reddy B et al,[19] showed prevalence to be 51.6%.

CONCLUSION

The present study highlights significant disparities in the demographic characteristics, nutritional status, morbidity patterns, parental literacy, and healthcare-seeking behaviors among children from urban, rural, and tribal areas. Urban areas had a predominance of nuclear families, higher parental literacy, and better socioeconomic status, while rural and tribal areas showed higher prevalence of health issues such as underweight, oral problems, and stunting. Tribal children, in particular, experienced the highest burden of multiple morbidities, including pallor,

skin diseases, and worm infestations, which were more prevalent among children of illiterate mothers. Healthcare access was also notably delayed in tribal regions, with a substantial reliance on quacks and self-recovery. Improving maternal education, enhancing awareness regarding hygiene and nutrition, strengthening primary healthcare services, and ensuring better access to preventive and curative care in rural and tribal areas are essential steps toward reducing the paediatric morbidity burden. Tailored public health strategies focusing on these vulnerable populations are necessary to bridge the gap in child health and contribute to the overall development of the nation.

REFERENCES

1. Pradyuth Kumar Mandal, SK.Rafikul Rahaman, Mrinalkanti Kanti Karmakar, Kripasindhu Chatterjee, Sanjay Kothari, Rafique Ahmed. Study of morbidity pattern of children up to the age of five years with special reference to osseous development. Int J Contemp Pediatr. 2018;5(2):477-482
2. Shali Vyas, SD Kandpal, Jayanti Semwal and Deepshika. A study on morbidity profile and associated risk factors in a rural area of Dehradun. J Clin Diagn Res. 2014 Aug;8(8):JC01-4.
3. Sarika Manhas. Morbidity profile of Tribal Gujjar children of Udhampur district of J&K. Journal of Scientific Research 2021;65(4):62-70
4. National Family Health Survey (NFHS-4), 2015-16. International Institute for Population Sciences.
5. Available from https://ruralindiaonline.org/en/library/resource/national-family-health-survey-nfhs-4-2015-16-india/[accessed on August 20, 2022].
6. MadhiwallaN.Healthcare in urban slums in India. Natl Med J India 2007;20(3):113–114
7. UN-Habitat: The Challenge of Slums. Global Report on Human Settlements 2003. London & Sterling, VA: Earth scan Publications Ltd. [accessed onAugust 20, 2022].
8. Gómez, F., Galvan, R.R., Cravioto, J., & Frenk, S. (1956). Malnutrition in infancy and childhood, with special reference to Kwashiorkor. Advances in Pediatrics.1956;7:131–169
9. Chinmay N. Gokhale, Chaitali A. Borgaonkar, Sunita S. Shanbhag, Mridula J. Solanki1, Milind M. Rasal. Morbidity pattern among primary school children in a tribal area of Maharashtra. Int J Community Med Public Health 2018;5(1):165-169.
10. Palash Das, Mausumi Basu, Gautam Dhar, Sarmila Mallik, Ranabir Pal. Nutritional status and morbidity pattern of government primary school children in north Kolkata of West Bengal, India. South East Asia Journal of Public Health 2012; 2(1): 13-17.
11. Neeti Verma, Prashant Kumar Bajpai. Health status of primary school children: study in urban slums of Lucknow. International Journal of Community Medicine and Public Health. 2021; 8 (5):2228-2232.
12. Ajeet Singh Bhadoria, Neha Sareen, Umesh Kapil. Prevalence of underweight, stunting and wasting among children in urban slums of Delhi. International Journal of Nutrition, Pharmacology, Neurological diseases. 2013; 3(3): 323-324.
13. R.Maheshwaran, Jayashree S. Seeri, and Murth N. Narshim. A study on growth status of high school children in rural South India. Journal of Evolution of Medical and Dental Sciences 2013;2(45)8740-44
14. V.G.Rao, Rajeev Yadav, C.K. Dolla, Surendra Kumar, M.K.Bhondeley and Mahendra Ukey. Undernutrition and childhood morbidities among tribal preschool children. Indian Journal of Medical Research 2005; 122(1):43-47.
15. Sirigineedi Chandra Sekhar, Sidhartha Kiran Gollapalli, Amujuri Krishna Prasad, Duggirala Manikyamba4, Nerella Jwala Vasavi. Comparative study of disease patterns and scholastic performance among rural, urban and tribal government residential hostel children of East Godavari districtJ. Evolution Med. Dent. 2016; 5:1651-55
16. Nitin Saluja, S.K.Garg, Harivansh Chopra. Prevalence of morbidity and morbidity pattern in school children (5-11yrs) in urban area of Meerut. Internet Journal of Epidemiology 2011;9(2):1-5
17. Monika Kohli, Balvir S. Tomar, Rakesh Bilwal. Prevalence and Demographic Profile of Skin Disorders in school going children of Urban and Rural Jaipur. International Journal of Contemporary Medical Research 2019; 6(7):2454-2459
18. Virendra Kumar Kurrey, Sharma Lokesh, Nahrel Rakesh, Phuljhele Sharja. Study of Health status and morbidity pattern in 5-18 years Birhor children: A primitive tribe of Chhattisgarh. Indian Journal of Child Health 2017;4(2):180-183
19. A.Meriton Stanly, B.W.C. Sathiyasekaran, G.Palani. A population based study of acute diarrhoea among children under 5 years in a rural community in South India. Sri Ramachandra Journal of Medicine 2009;1(1): 1-7.
20. Venkatashiva Reddy B, Yadlapalli S.Kusuma, Chandrakant S. Pandav, Anil Kumar Goswami, Anand Krishnan. Prevalence of malnutrition, diarrhoea, and acute respiratory infections among under-five children of Sugali tribe of Chittoor District, Andhra Pradesh, India. Journal of Natural Science, Biology and Medicine 2016;7:155-60.
21. Sujata Murarkar, Jayashree Gothankar, Prakash Doke, Girish Dhumale, Prasad D. Pore, Sanjay Lalwani et al. Prevalence of the Acute Respiratory Infections and associated factors in the rural areas and urban slum areas of Western Maharashtra, India: A community based cross sectional study. Frontiers in Public Health. 2021;26(9):723807.