Innovations

Urban - Rural Disparities in Nutritional Status of Under-Five Children: A Study in Coastal Andhra Pradesh

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Abstract:

Introduction: *Childhood is a critical period for physical and psychosocial development, with under-five children being particularly vulnerable to various morbidities, including malnutrition. Despite global progress in reducing child mortality, disparities persist between urban and rural populations, particularly in developing regions like coastal Andhra Pradesh. This study aims to investigate the nutritional status and morbidity patterns among under-five children in urban and rural settings, addressing the gap in understanding how these factors differ across environments.* ***Objectives:*** *The primary objectives of this study are to compare the nutritional status of under-five children in urban and rural field practice areas of a teaching hospital in coastal Andhra Pradeshand to assess the overall nutritional status of the children involved in the study.* ***Methods:*** *This cross-sectional study was conducted over a year, with data collection spanning six months from June to November 2024. A total sample size of 300 children aged six months to five years was determined using systematic random sampling. Data were collected through pre-tested questionnaires, clinical examinations, and anthropometric measurements. Statistical analysis was performed using SPSS software to evaluate differences in nutritional status and morbidity patterns.* ***Results:*** *The findings revealed no significant difference in malnutrition grading between urban (9.7% under -3 SD for height) and rural children (24.3% under -3 SD for height). Overall, rural children exhibited poorer nutritional outcomes compared to their urban counterparts, particularly regarding height-for-age metrics.* ***Conclusion:*** *This study highlights significant urban-rural disparities in the nutritional status of under-five children in coastal Andhra Pradesh. The results*

underscore the need for targeted interventions to address malnutrition and improve child health outcomes, particularly in rural areas where resources are limited. Continued research is essential to inform policy and resource allocation for child health initiatives.

Keywords: *Nutritional assessment, malnutrition , under- five mortality , urban – rural disparities , undernutrition*

Introduction:

Children constitute most of the vulnerable groups of the population and constitute the majority of the population who are more prone for the morbidities, especially infections. First few years of life are most crucial for the physical and psychosocial development of the child. The care in these few years almost reflects the entire life of a person both physically and mentally.

Any adverse influences during this period may result in severe limitations in this age group is most affected by various common and easily treatable illness. Three in four episodes of childhood illnesses are caused by one of these conditions - acute respiratory tract infections (pneumonia), diarrhoea, measles, malaria, malnutrition or a combination of these conditions. These causes became the most common causes of morbidity and mortality in under five-year children.[1]

Over the last two decades, worldwide statistics have shown substantial progress in reducing mortality among children. Still, in 2017 alone,6.3 million children under age fifteen years died out of which 5.4 million in the first five years out of which 2.5 million children died in the first month of life,1.6 million deaths at age 11 months,1.3 million deaths at age 1-4 years. Globally 85% of 6.3 million deaths in children and adolescents occurred during the first five years of life.[2]

The developing world is rapidly urbanizing, but our understanding of how child health differs across urban and rural areas is lacking. Simple height-for-age averages show that rural Indian children have the poorest health and urban children the best, with slum children in between.[3]

The condition of children in rural zones is unstable since health care is a privilege that is only accessible for a small affluent portion of the population. Because of this extreme lack of resources, the quality of health for impoverished children remains very low. Studies of the urban setting demonstrate elevated levels of infant mortality that are principally caused by large concentrations of poverty and insufficient services that one finds in the savage urban settlements like the slums and shantytowns.[3]

The Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 were developed to promote healthy lives and well-being for all children. The

SDG Goal 3 is to end preventable deaths of newborns and under-5 children by 2030. There are two targets:

1. Reduce newborn mortality to at least as low as 12 per 1000 live births in every country (SDG 3.2); and
2. Reduce under-five mortality to at least as low as 25 per 1000 live births in every country(SDG 3.2).[4]

The literature search revealed limited data on the morbidity profile as a whole in the under-fives. There is a need for community-based information on morbidity patterns among under-fives will be of use in assessing the overall impact of improved nutritional and immunization status as a result of various ongoing nutritional improvement and disease control programs as well as in planning resource allocations at the national level.[5]

Finally, to help understand the changing urban-rural gap in child health and nutritional status, the investigator tries to examine possible linkages: whether urban children are better off than rural children in terms of nutritional status, socioeconomic profile, proper health care utilization and how these two factors between urban and rural areas are changing the trends in child health.

1. To compare the nutritional status in under-five children in urban and rural field practice areas of Konaseema Institute of Medical Sciences and Research Foundation , Amalapuram
2. To know the socio-demographic profile of the study subjects.

Materials and Methods:

Study Design: Cross-sectional study

Study population: Under-five (6 months to 5 years)age children in urban and rural field practices of a teaching hospitalin coastal Andhra Pradesh

Study Period: 6 months for the data collection, analysis and report writing from June 2024 to November 2024

Sample size: Taking into consideration of National Family Health Survey 4 factsheet [6]of Andhra Pradesh,number of diarrhoea cases in under five children reported to health facility in last two weeks preceding the survey in urban areas and rural areas respectively is P1=83.2 % and P2 = 69.4 % .
Thus the sample required for each group group is 149
Total sample size is 298 rounded off to 300.

Inclusion criteria:
Children from six months to five years of age

Exclusion criteria:

1. Children below six months
2. Congenital anomalous child
3. Severely ill child
4. Children who were absent for at least three consecutive visits
5. A non-cooperative child while taking anthropometry
6. Parents who did not give consent.

Sampling method:

Systematic random sampling was followed. Every 10^{th} house was selected for the study.

Ethical considerations:

The study population will be explained the purpose of the study, and consent will be taken from the subjects in the local language. This study is purely descriptive in nature, and no drug intervention is included.

Study tools:

A pre-tested questionnaire was used for collecting the required information. Data was collected from the mothers of the children under five years of age regarding socio-demographic profile, clinical examination along with anthropometric measures was done in urban and rural field practice areas of Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram

The data was analyzed using M.S. Excel and SPSS software version 20 and appropriate statistical tests of significance were employed in the needed situations in the presentation of data. WHO Anthro software was used to calculate nutritional status of the study participants.

Instruments Used :

1. Measuring tape
2. Stadiometer
3. Infantometer
4. Shakir's tape
5. Weighing machine:

Results

Table 1 .Nutritional status of the study population based on mid upper arm cirumference

Grading of Malnutrition Based on Mid Upper Arm Circumference	Place of Stay	
	URBAN	RURAL
Severe malnutritiion (<11.5 cm)	43(28.7%)	49(32.7%)
Moderate malnutrition (11.5 - 12.5 cm)	65(43.3%)	60(40%)
Mild or no malnutrition (>12.5cm)	42(28%)	41(27.3%)
TOTAL	150	150

Chi-square = 0.603 df = 2 p value = 0.740

There is no significant difference in the grading of malnutrition (according to MUAC) between urban and rural areas.

Nutritional status of the study population according to their age group in the urban area

Table 2A. According to the weight for age

Age groups	N	Weight-for-age %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	0	12	0.66	1.98
(6-11)	5	0	0	0.97	1.23
(12-23)	67	0	0	1.08	1.6
(24-35)	21	0	0	1.36	1.78
(36-47)	39	0	33.3	-0.4	2.2
(48-60)	18	0	27.8	0.53	2.37

Table 2B. According to the Length/Height -for-age

Age groups	N	Length/Height -for-age %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	9.7	17.9	-0.48	2.1
(6-11)	5	0	0	2.19	2.7
(12-23)	67	13.4	23.9	-0.32	2.5
(24-35)	21	0	0	0.2	0.91
(36-47)	39	14.7	14.7	-1.56	1.32
(48-60)	18	0	27.8	-0.56	1.32

Table 2C. According to the Weight-for-height/length

Age groups	N	Weight-for-height/length %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	4	7.3	0.71	2.25
(6-11)	5	20	20	0.03	2.72
(12-23)	67	7.4	7.4	0.83	2.24
(24-35)	21	0	0	0.95	2.52
(36-47)	39	0	13.3	0.16	2.04
(48-60)	18	0	0	1.24	2.23

According to the weight for age in urban areas including both genders, there is no child below 3 S.D., but according to the length/height for age,9.7% of children were under -3 S.D.

According to weight for length /height,4 % children below 3 S.D.

Nutritional status of the study population according to their age group in the rural area

Table 3A. According to the weight for age

Age groups	N	Weight -for-age %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	2.7	12.2	0.44	1.83
(6-11)	10	0	0	1.11	1.45
(12-23)	59	0	5.1	0.8	1.63
(24-35)	24	0	0	1.2	1.65
(36-47)	34	11.8	26.5	-0.61	1.96
(48-60)	23	0	26.1	0.07	1.75

Table 3B. According to the Length/Height -for-age

Age groups	N	Length/Height -for-age %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	24.3	40.5	-1.61	2.11
(6-11)	10	25	25	0.24	3.17
(12-23)	59	27.1	40.7	-1.36	2.49
(24-35)	24	4.2	4.2	-0.58	1.29
(36-47)	34	23.5	38.2	-2.35	1.23
(48-60)	23	39.1	87	-2.89	1.03

Table 3C. According to the Weight-for-height/length

Age groups	N	Weight for Length/Height %		Mean	SD
		% < -3SD	% < -2SD		
Total (0-60)	150	0.8	2.4	1.11	2.15
(6-11)	10	0	0	1.34	1.98
(12-23)	59	0	0	0.96	1.92
(24-35)	24	0	0	1.49	2.37
(36-47)	34	3.2	9.7	0.59	2.24
(48-60)	23	0	27.8	-0.56	1.32

According to the weight for age in rural areas including both genders, 2.7% of children were below 3 S.D., but according to the length/height for age,24.3 % children were under -3 S.D.

According to weight for length /height,0.8 % children below 3 S.D.

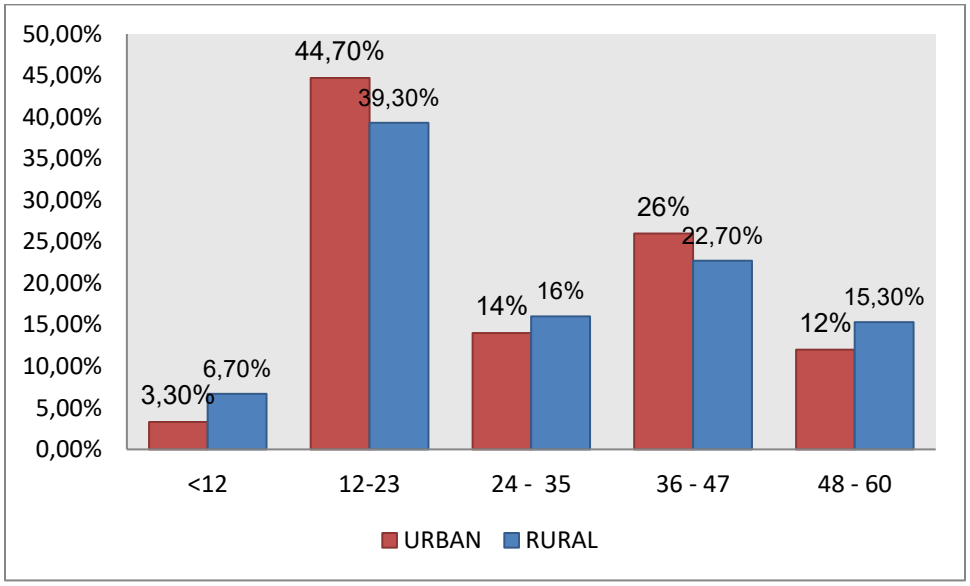

Fig 1. Distribution of the study population according to their age between urban and rural areas field practice areas.

Table No.4. Association of the utilization of Anganwadi services among the mothers of study population and place of stay

ANGANWADI SERVICES	PLACE OF STAY	
	URBAN	RURAL
TAKEN	96(64 %)	108(72 %)
NOT TAKEN	54(36 %)	42(28 %)
TOTAL	100 %	100 %

Chi-square = 2.206 df = 1 p value = 0.137

Utilization of Anganwadi services is better in rural areas than in urban areas, and the difference is not significant.

Table No.5 Association of exclusive breastfeeding practices among the mothers of study population and place of stay

Exclusive Breastfeeding	Place of Stay

	URBAN	RURAL
YES	134(89.3 %)	90(60 %)
NO	16(10.7 %)	60(40 %)
TOTAL	150(100%)	150(100%)

Chi-square = 34.117 df = 1 p value = 0.000
Exclusive breastfeeding practices are higher in urban areas than in rural areas, and the difference observed found to be significant.

Discussion:
In urban areas, 44.7 % belong to the age group 12 to 23 months, and in rural areas, most of them (39.3 %) belong to the age group 12 to 23 months.

In urban areas, 52.7% are females, and 47.3 % are males, in rural areas, 51.3 % are females, and 48.7 % are males.

In the urban area, 55.3% of the study population belongs to Hindu religion, 22.7 % of the study population belong to the Muslim religion, 22 % of the study population belong to Christianity as compared to in the rural area, 60% of the study population belong to Hindu religion, 22.7% of the study population belong to the Muslim religion, 18 % of the study population belong to Christianity.

Most of them, i.e., 35.3% belong to the middle socioeconomic class in both urban and rural areas, 32 % belong to the upper-middle class in urban and rural areas. The difference is not significant.(p=0.766)

In this study, in a rural area, 32.7% of the study population suffer from severe malnutrition, 40 % have moderate malnutrition and 27.3 % have mild or no malnutrition. In the urban area, 28.7 % of the study population suffer from severe malnutrition, 43.3 % have moderate malnutrition and 28 % have mild or no malnutrition. The difference is not significant (p = 0.740).

In a study conducted by Gaurav et al. (2014)[7] in Nepal, seventeen per cent of under- 5 children were moderately, and 10.4 % were severely underweight. Similarly, 22.9% and 17.5% were found to be moderately and severely stunted respectively. Less than 10% were found to be moderately and severely wasted. The older age group of children, education level of the mother, not exclusive breastfeeding practice had significant (p <0.05) effect on stunting. More than 50% of children were affected by stunting, underweight and wasting at the same time.
Exclusive breastfeeding practices are higher in urban areas (89.3%) than in rural areas (60%), and the difference observed found to be significant (p=0.000).

In a study conducted by Oommen et al. (2009)[8], EBF at discharge was low (urban 38%; rural 57%). Formula milk was fed by 55% of urban mothers during the hospital stay—mothers in the rural setting fed honey, tea and water (10-16%). Perception of breastmilk is best for the newborn baby promoted EBF in 74% urban and 36% rural mothers.

Exclusive breastfeeding is followed more in urban areas than in rural areas. Maternal nutrition and literacy play an important role in the perception towards exclusively breastfeeding the children.

Among 150 study population in rural area, 72 % of mothers utilized anganwadi services whereas in the urban area, 64% of mothers utilized anganwadi services. There is no significant difference between the utilization of anganwadi services by the mothers of the study population in urban and rural areas (p=0.137)

Among 150 study population in rural area, 99.3 % utilized antenatal services, whereas, in the urban area, 94 % utilized antenatal services. There is no significant difference between the utilization of antenatal services by the mothers of the study population in urban and rural areas (p=0.19)

In a study conducted by Rajpal et al. (2016)[9], the antenatal service utilization by mothers during pregnancy was about 20 % higher for rural areas (60.5 per cent; 95% CI: 60.3; 30.7) than urban areas (38.8 per cent; 95% CI: 38.4; 39.1). They also found a lower utilization of services related to health and nutrition education during pregnancy (41.9 per cent in rural) and early childcare (pre-school) (42.4 per cent)

In this study, the prevalence of low birth weight of the children is higher in rural areas than in urban areas, and the difference is significant (p=0.000).

In a study conducted by Kaur et al. [10], the prevalence of low birth weight infants was 6.38%. Rural mothers had more low birth weight infants than urban women (9.8% vs 2.0%, $p = 0.03$).

Low birth weight depends on both maternal, placental and foetal factors right from the intrauterine life. Prevalence of low birth weight is more in rural areas than in urban areas due to poor maternal nutrition during the antenatal period in rural areas.

Conclusion:

This study gives an explicit knowledge of the urban-rural disparities in the under-five children health status, and the findings may help out to move towards the erasing the gap.

The following strategies should be followed to reach the target:

1. Consideration of maternal and child component of health as a single entity.
2. Strengthening of existing maternal-child services through proper implementation of the plan and programme.

3. Identifying at-risk children and prompt intervention.
4. Overall improvement of the socioeconomic, environmental factors responsible for the urban-rural gap.

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