COMPARATIVE STUDY OF NUTRITIONAL STATUS OF ANGANWADI CHILDREN IN URBAN, RURAL AND TRIBAL AREAS OF UDAIPUR DISTRICT

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ABSTRACT
Background: Health is the state of complete social, physical, psychological and spiritual well-being of human beings. **In Children, the role of Nutrition and status of Health** plays a pivotal role in the physical growth, emotional and mental development of children and it is emphasized to provide optimal nutrition to the children, particularly in the early years of life. Immunization not only reduces morbidity and mortality from potentially infectious diseases but also interrupts disease transmission in the community.
Methodology: Facility based cross sectional study to compare the nutritional status of children attending Anganwadi centers in urban, rural and tribal areas of Udaipur district through two stage sampling technique.
Results: Severely underweight children was maximum from tribal area (11.7%) followed by rural (9.6%) and urban side (7.5%). Stunted children was from tribal side (18.3%) followed by 15.4% from rural side and 11.5% urban side. Wasted children were from tribal side (24.2%) followed by 20.5% in rural and 15.5% in urban.
Conclusion: Under-nutrition is more in tribal and rural than urban children. Improvement in diet related aspects at Anganwadis can be done by appropriate information about the means of livelihood, education and good health of parents. It requires a strong political will and sustainable efforts of the community, the policy makers and implementing agencies.

Keywords: Nutritional status, Anganwadi , Tribal, Urban, Rural

INTRODUCTION

Children are the backbone of any country & their health is a prime concern of the country[1]. Pre-school children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of community health & nutrition. Under nutrition among them is one of the greatest public health problems in developing countries. About 128 million (70%) of the world's 182 million stunted children aged under five years live in Asia [2]. Nutritional status plays a vital role in deciding the health status particularly in children. Nutritional deficiencies give rise to various morbidities, which in turn, may lead to increase mortality[2].

Protein Energy Malnutrition (PEM) has been identified as a major health and nutrition problem in India. It occurs particularly in weaklings and children in first years of life[3]. The incidence of PEM in India in pre-school age children is 1-2 % and prevalence of mild, moderate and severe PEM is 38%, 44% and 9% respectively.

The adverse effects of malnutrition are growth failure, breakdown of immunity, increased susceptibility to infections, prolongations of the recovery period, impairment of mental capacity and motor skills, decreased alertness and physical capacity. PEM accounts for 5% deaths among pre-school children, thus PEM is not only a health problem but also a social and economic problem[4].

Since the growing children are nutritionally vulnerable, and they are the future citizens of the country, the strength and pride of the nation depend upon their health.

OBJECTIVE

To compare the nutritional status and to suggest measures to improve nutritional status of children attending Anganwadi in urban, rural and tribal areas of Udaipur district .

MATERIALS AND METHODS

Study Design and Area

Facility based cross sectional study which was conducted at Anganwadi centers of Udaipur district which has total 3175 Anganwadi centers, out of which 2805 are main and 370 are mini Anganwadi centers. Study was conducted in main Anganwadi centres.

Sample size:

Where the population is unknown, the sample size can be derived by computing the minimum sample size required for accuracy in estimating proportions by considering the standard normal derivation set at 95% confidence level (1.96),picking a choice or response (50%=0.5) and the confidence interval (0.05=±5). The formula is:

$n = Z^2 pq / e^2$

$= (1.96)^2 x0.5 x0.5 / (0.05)^2$

$= 0.9604/0.0025$

$= 384.16 = 385$

Z = 1.96, p = 0.5 (50%), q = 1-p = 0.5, e = 0.05

Z = standard normal deviation set at 95% confidence interval

p = percentage picking a choice or response

e = the desired level of precision (i. e. the margin of error)

From our calculation, our sample size is 385 but for reducing error total sample taken were 450.

Study Participants:

All the children present at selected Anganwadi centre on the day of visit were included in the study.

➤ **Inclusion Criteria**: All children from 6 months to 6 years present on visit day of selected urban, rural and tribal Anganwadi centers of Udaipur district.

➤ **Exclusion Criteria**: Children absent on visit day.

Study Period:
6 months from February 2019 to July 2019.

Sampling method:
Two stage sampling technique was used for the selection of Anganwadi centers for the study.

Sampling technique:
There are 12 blocks in Udaipur district. Out of which there are 3 Rural blocks, 1 urban block and 8 tribal blocks.
1. In first stage, after line listing and by lottery method, one each from rural & tribal block were chosen. Since there was only one block in urban area which was chosen.
2. In second stage, all the Anganwadi centers under these selected blocks were line listed and by systemic random sampling, every 5th Anganwadi centers was chosen.

So 28 Anganwadi centers out of 138 in Udaipur city block (Urban), 25 out of 126 Anganwadi centers in Badagaon block (Rural) and 28 Anganwadi centers out of 138 were selected from Kherwara block (Tribal) so a total of 81 Anganwadi centers were selected.
In the next step information was gathered from all the children attending Anganwadi on that particular day.

Tools and technique:
Pre-designed and pretested performa was used for collection of data. For Anthropometric measurements like height, weight and mid upper arm circumference standards were taken according to WHO criteria.

Data Analysis
a. Data was entered in Microsoft excel and data analysis was done on SPSS version 16. The plan was submitted to the Ethical Committee of the Institute and study was initiated only after ethical approval.
b. Data was expressed in percentages.
c. Appropriate test of significance was applied.
d. P<0.05 was considered significant.

ETHICAL ISSUES
1. A written and informed consent was taken from all concerned competent authority/study subjects.
2. No pressure or coercion was exerted on subjects for participation in the study.
3. Confidentiality and privacy was ensured at all stages.
4. Data was used for research purpose only.

RESULTS
Table 1:-Distribution of selected Anganwadi in Udaipur District

Anganwadi Type	No. of Anganwadi	Percentage
Urban	28	34.6
Rural	25	30.8
Tribal	28	34.6
Total	**81**	**100**

From above table, 34.6 % Anganwadis are from urban area followed by tribal area (34.6%) and rural areas (30.8%) which shows near equal representation of whole different group of population.

Table 2: Distribution of children according to gender with type of location of Anganwadi

Gender	Location			Total (%)
	Urban (%)	Rural (%)	Tribal (%)	
Female	78(44.8)	66(42.3)	50(41.7)	194(43.1)
Male	96(55.2)	90(57.7)	70(58.3)	256(56.9)
Total	174(100)	156(100)	120(100)	450(100)

Above table reveals that more number of the respondents (56.9%) are from male category and rest were females (43.1%).In urban (55.2%), rural (57.7%) and tribal(58.3%) areas male predominance was maintained equally.

Table 3: Distribution of Children according to Religion

Religion	No. of children	%
Hindu	379	84.2
Muslim	43	9.6
Christian	17	3.8
Sikh	8	1.8
Other	3	0.7
Total	**450**	**100**

Above table shows that majority of the respondents (84.2%) were Hindu followed by Muslim (9.6%), Christian(3.8%), Sikh(1.8%) and other (0.7%).

Table 4: Age-wise distribution of children with Type of Location of Anganwadi

Age of the children	Location			Total (%)
	Urban (%)	Rural (%)	Tribal (%)	
Below 2 year	22(12.6)	12(7.7)	16(13.3)	50(11.1)
2-3 years	43(24.7)	47(30.1)	30(25)	120(26.7)
3-4 years	29(16.7)	35(22.4)	28(23.3)	92(20.4)
4-5 years	42(24.1)	32(20.5)	24(20)	98(21.8)
5-6 years	38(21.9)	30(19.3)	22(18.4)	90(20)
Total	174(100)	156(100)	120(100)	450(100)

Majority of children (26.7%) included in the study belonged to 2-3 years age group followed by 4-5 years age group (21.8%), 3-4 years (20.4%), 5-6 years(20%) and lowest proportion children 11.1% in below 2 years. Children of below 2 year was less in all the participants group while number of children were nearly equal in rest other age groups in rural, urban and tribal areas.

Table 5: Distribution of Children according to Weight for Age with type of location of Anganwadi

Weight for Age	Location				Chi-square value	P value
	Urban (%)	Rural (%)	Tribal (%)	Total (%)		
Normal	129(74.1)	98(62.8)	75(62.5)	302(67.1)		
Underweight	32(18.4)	43(27.6)	31(25.8)	106(23.6)		
Severely Under Weight	13(7.5)	15(9.6)	14(11.7)	42(9.3)	6.7469	0.14
Total	174(100)	156(100)	120(100)	450(100)		

Above table shows that 67.1% respondents are normal, 23.6% are underweight and 9.3% are severely underweight. Majority of respondents from tribal area (11.7%) are severely underweight followed by rural respondents (9.6%) and urban area (7.5%).27.6% respondents from rural area are

underweight than followed by tribal area (25.8%) and urban area (18.4%). This difference was found statistically non significant. (Chi-square value = 6.7469, P value = 0.14)

Table 6: Distribution of children according to Height for Age with type of location of Anganwadi

Height for Age	Location				Chi-square value	P- value
	Urban (%)	Rural (%)	Tribal (%)	Total (%)		
Normal	146(83.9)	128(82.1)	90(75)	364(80.9)		
Stunted	20(11.5)	24(15.4)	22(18.3)	66(14.7)		
Severely Stunted	8(4.6)	4(2.5)	8(6.7)	20(4.4)		
Total	174(100)	156(100)	120(100)	450(100)	6.976	0.13

Above table shows that the total respondents (14.7%) are stunted and 4.4% are severely stunted. Majority of the respondents, 18.3% from tribal area are stunted followed by 15.4% from rural side and 11.5% from urban side.6.7% respondents from tribal side are severely stunted followed by from urban side (4.6%) and rural side (2.5%) . This difference was found statistically non significant. (Chi-square value = 6.976, P value = 0.13)

Table 7: Distribution of children according to Weight for Height with type of location of Anganwadi

Weight for Height	Location				Chi-square value	P value
	Urban (%)	Rural (%)	Tribal (%)	Total (%)		
Normal	139(79.9)	105(67.4)	84(70)	328(72.9)		
Wasting	27(15.5)	32(20.5)	29(24.2)	88(19.6)		
Severely Wasting	8(4.6)	19(12.1)	7(5.8)	34(7.5)		
Total	174(100)	156(100)	120(100)	450(100)	11.7018	0.02

Above table shows that 19.6% respondents had wasting and 7.5% are severely wasting, while majority of the respondents had Normal weight for height (72.9%). Majority of respondents (24.2%)were tribal followed by (20.5%) rural and (15.5%) urban in wasted group. 12.1% respondents were from rural side followed by 5.8% tribal and 4.6% urban in severely wasting group. This difference was found statistically significant. (Chi-square value = 11.7018, P value = 0.02)

Table 8: Distribution of children according to Mid Arm circumference with type of location.

MUAC	Location				Chi-square value	P value
	Urban (%)	Rural (%)	Tribal (%)	Total (%)		
<12.5CM	7(4.1)	11(7.1)	9(7.5)	27(6)		
12.5-13.5 CM	24(13.8)	19(12.2)	23(19.2)	66(14.7)		
>13.5 CM	143(82.1)	126(80.7)	88(73.3)	357(79.3)	5.0395	0.28
Total	174(100)	156(100)	120(100)	450(100)		

Majority of respondents (79.3%) had mid arm circumference greater than 13.5 cm followed by 14.7% had 12.5-13.5cm and 6% had less than 12.5cm. Majority of respondents 19.2% from tribal side had mid arm circumference 12.5-13.5 cm followed by 13.8% from urban and 12.2% from rural side. Majority of respondents (7.5%) from tribal side had mid arm circumference less than 12.5 cm followed by rural side i.e. 7.1% and urban side i.e. 4.1%. This difference was found statistically non-significant. (Chi-square value = 5.0395, P value = 0.28)

DISCUSSION

A total of 81 Anganwadis children were evaluated in this study over a period of 6 months. In this study a higher proportion of male children (56.9%) as compared to female children (43.1%) were observed at Anganwadi centers. In the study by Mandal GC et al 49.20% of children were male and 50.79% were female[10].In the study conducted by Deshmukh PR et al in under six children 52% were

male and 48% were female[11]. In all three categories of rural, urban and tribal Anganwadis, proportion of male children (55.2% to 58.3%) was higher than female children (41.7% to 44.8%).

According to weight for age among all the respondent children, 67.1% are normal, 23.6% are underweight and 9.3% are severely underweight. Underweight is the composite index of chronic/acute malnutrition so it is compared to other studies which shows in term of malnutrition only. **Dinesh Kumar (2006)[5]** study revealed that among all under five children surveyed, 36.4% were underweight (<2SD weight- for - age).

Proportion of severely underweight children was maximum from tribal area (11.7%) followed by rural (9.6%) and urban side (7.5%). Maximum proportion of underweight children was from rural location (27.6%) followed by tribal side (25.8%) and urban side (18.4%). **Rao K M et al., (2006)[6]** have also shown that the nutritional status of tribal people is relatively backward when compared with their rural counter parts. **Asha Ram Tyagi et al., (2015)[7]** study, according to it more rural 3.7% than urban 1.9% 0-3 years children were found severely underweight (red zone).

According to height for age among all the respondent children, 14.7% were stunted and 4.4% were severely stunted. Maximum proportion of stunted children was from tribal side (18.3%) followed by 15.4% from rural side and 11.5% (urban side). 6.7% respondents from tribal side are severely stunted followed by from urban side (4.6%) and rural side (2.5%). These findings are similar to results of **NFHS-3 (2005-06)[8]** which shows that various degrees of wasting and stunting are relatively more in rural areas than in urban region. **Dinesh Kumar (2006)[5]** in his article, revealed that among all under five children surveyed 51.6% stunted (<2SD height- for- age).

According to weight for height among all the respondent children, 19.6% children had wasting and 7.5% are severely wasting, while majority of the children had normal weight for height (72.9%). Maximum wasted children were from tribal side (24.2%) followed by 20.5% in rural and 15.5% in urban. **Gragnolati M, (2005)[9]** study revealed that about 20% of the children are moderately to severely wasted (thin for height) and 48% are moderately to severely stunted (short for age).

In this study it was found that majority of respondents (79.3%) have mid arm circumference greater than 13.5 cm and 14.7% have between 12.5 to 13.5cm and 6% have less than 12.5cm. Mild undernutrition i.e. MUAC= 12.5-13.5cm was maximum in tribal children (19.2%) followed by 13.8% in urban and 12.2% in rural children. Severe undernutrition i.e. MUAC= <12.5cm was also maximum in tribal children (7.5%) followed by rural (7.1%) and urban (4.1%) children.

CONCLUSION
Children are the backbone of any country & their health is a prime concern of the country. Their nutritional status is a sensitive indicator of community health & nutrition. Under nutrition among them is one of the greatest public health problems in developing countries. In underweight children, maximum proportion was of rural and tribal children. Similarly, stunting and wasting was also in rural and tribal areas. Undernutrition is more in tribal and rural children than urban children. Improvement in diet related aspects at Anganwadis and measures to improve socioeconomic status can bring about a big change in the nutritional status of children. This can be done by appropriate information about the means of livelihood, education and good health of parents. It requires a strong political will and sustainable efforts of the community, the policy makers and implementing agencies.

RECOMMENDATIONS
1. 1.The extent of malnutrition can be countered by educating the parents with respect to basic nutritional requirements of their children and health education should be given to mothers during

antenatal and postnatal visits and encouraging them to consume locally available low cost nutritious foods through Anganwadi worker and health worker.

2. Emphasis should be paid to improve literacy status of female as it has prime role in prevention of malnutrition and morbidity associated with malnutrition.

LIMITATIONS
The study undertaken was restricted to the selected Anganwadi centers of Udaipur district and we could not cover all the Anganwadi centres.

FUNDING
No funding services

CONFLICT OF INTEREST
None declared.

ETHICAL APPROVAL
The study was approved by the Institutional Ethics Committee, Rabindra Nath Medical College and attached hospital, Udaipur (Rajasthan).

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