



“Compare the Nutritional Status and Dietary Diversity of Rural and Urban School Aged Children in Bagalkot, Karnataka.”

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KEYWORDS

Dietary diversity, Nutritional status, Primary school, Rural, Urban.

ABSTRACT:

Background: In India there persists a huge difference between urban and rural life. The children in their school age explore and experience new things that directly or indirectly influence their health. One of such things in diversity in their diet.

Objective: the aim of the study was to compare the nutritional status and dietary diversity of rural and urban school aged children, Bagalkot, Karnataka.

Method: Two samples were selected by stratified random sampling technique. One from rural primary school (N= 274) and another from urban primary school (278). The data was collected by structured questionnaire and FANTA dietary diversity tool. Chi square test was used to determine the difference between dietary diversity and Mann Whitney's test was used to compare nutritional status.

Result: the mean age of urban children was 9.18 ± 2.12 years and mean age of rural children was 9.09 ± 2.22 years. There was no significant difference found between dietary diversity of urban and rural children. A significant difference ($P < 0.002$) was found in weight for age of rural children and urban children.

Conclusion: The availability of diet in rural and urban area is similar. There is significant difference in nutritional status in terms of weight for age of rural and primary school children.

Introduction:

The children between 6 to 12 years of age apparently explore the external world with high curiosity and enthusiasm. It is age in which children start giving more importance to social interactions. In this age children are often found indulge in physical activities that build their physical strength, muscular coordination and self-confidence. Children learn to extent their physical limits and explore their surroundings with attempts of trial-and-error. A child's body weight and height keep growing with optimum ratio. Optimum growth is possible with appropriate nutrition, adequate sleep and both physical and mental exercise¹.

According to 2022 statistics there are around 15,09,236 schools in India. In that 12.59 lakh schools are in Rural areas and 2.50 lakh in Urban India. Around 26.5 crore children are going to school. Usually, parents encounter a huge challenge in feeding

balanced diet to their school aged children. Nutrition of school aged children is of paramount importance because the nutritional status in this age has impact on later life. It is a dynamic period of their physical growth as well as of their mental development.³

According to UNICEF, proper nutrition is of utmost importance during school age, as it is the age of social maturation and preparation of body for puberty⁴. The easy availability and tempting flavours of junk food, makes substantial disturbance in consumption of balanced diet among children⁵. In India around 65% of population is residing in rural area and around 32% in urban areas. surprisingly with advancing urbanization, the advanced and technical facilities are also available in urban areas, but the rural section with major portion of population is deprived of many basic facilities like technically advanced health care and advanced educational system. children in urban area enjoy technically advanced facilities but they are also



exposed to many adulterated foods that can affect their health and deprive them from consuming healthy balanced diet, making their body more vulnerable to malnutrition. In turn rural children are believed to be affected by poverty and lack the availability of protein rich diet⁶.

The foods can be divided in to 9 different groups and everyone should consume a part of each group, to satisfy the nutritional requirement of the body. But many factors like availability, knowledge regarding basic nutrition, nutritional requirement of children, consumption of junk foods etc can reduce the diversity in foods consumed in turn causing the deficiency of one or another nutrient in the body⁷. The packed foods and junk foods come with additional flavouring agents and stimulate the taste buds leaving the consumer craving for more but the nutritious groups of food are usually less palatable and children often deny to consume them⁸. It is always a challenge for parents to make their children consume foods with all the nutrients. Hence if there is diversity or variety in consumption of food the children will have more chances of gaining optimum nutrition and maintaining body weight and height with normal parameters.⁹

The researcher felt the need of comparing and exploring the differences in the dietary diversity among school of children of urban area and rural area and determine how the dietary diversity is affecting the nutritional status of these children.

Aim: comparing the nutritional status and dietary diversity of rural and urban school aged children.

Methods and materials:

Study design: This is a descriptive, comparative design study, intended to compare the nutritional status and dietary diversity of rural and urban school aged children residing in Bagalkot, Karnataka, India.

Study location: The study was conducted in Bagalkot, Karnataka state, India. Bagalkot has around 21 lakhs population. According to 2011 census 31.64% of population resides in Urban area and 68.36% in Rural area¹⁰. Bagalkot is a block in the Bagalkot district of Karnataka which is having about 19 Cluster in it. All the Govt. and Private schools of the Bagalkot block are divided into different clusters of the schools.¹¹ The study was conducted in primary schools of Bagalkot. The study subjects were selected from two schools, one from urban area and the other from rural area. The

first school is Basaveshwara Kannada and English medium primary school, Vidyagiri Bagalkot and Government primary school Muchkandi village, Bagalkot.

Study Population and sample size determination:

The population for the study were the children between 6 to 12 years of age, studying in primary schools of Urban and Rural areas of Bagalkot. The sample size was calculated using G*power 3.1.9.4. The sample size was calculated considering Mann Whitney's two tailed test, with 0.3 effect size, 0.05 level of significance, 0.95 ($\beta = 1 - \alpha$) and allocation ratio 1:1. The calculated sample size was $246 + 246 = 492$. Considering 15% response/non response error, the sample size was increased to 560 (280 urban primary school children+ 280 rural primary school children). the data of 6 children from rural primary schools and 2 urban primary schools was omitted due to incomplete data and response errors. Hence the data was analysis was done using the data obtained from 274 rural primary school children and 278 urban primary school children.

Sampling procedure:

Sample was selected by stratified random sampling. 7 strata were prepared based on the age of children (6 years, 7 years, 8 years, 9 years, 10 years 11 years and 12 years) 40 children were selected from each stratum. The final sample included, 280 children from urban primary school and 280 children studying in rural primary school. 40 children were selected from each stratum by using simple random sampling. The researcher collected the details of each student, with their age and prepared separate chit with name of each student. The details of all the students were obtained with their age. All the students were divided into 7 strata. Name of all the students was written on all small chits. Chits of each stratum were put in a box and 40 chits were selected from each stratum box. Hence the sample size was 280 children from urban primary school and 280 children from rural primary school.

Sample selection criteria: The participants of the study were enrolled considering the following criteria; the children between 6 to 12 years of age, studying in primary school, residing in Bagalkot and Muchkandi village and whose parents give consent for participation of their children in the study were



included in the sample. The children who were sick or absent to school at the time of data collection and who had any chronic disorder were excluded from the study.

Data collection: Structured questionnaire prepared by researcher with both open and closed ended questions was used to collect the baseline information of participants.

Anthropometric Assessment

Body Weight: The body weight was measured using electronic weighing machine. The weight was checked with participant standing on weighing machine, bare foot with minimal clothing. They were asked to remove the substances in their pocket. The weight was checked twice for each child to confirm and aggregate was taken among the two readings, in case, if they were different.

Height: the height was assessed using stadiometer. The participants were asked to stand against the scale, with their heels, buttocks, scapula and occiput touching it. The point of height was marked with a hard and stiff centimetre/inch measuring scale. The height was recorded soon after measurement.

The data of individual subject (body weight, height, date of birth and gender) was entered in WHO Anthro plus software, to obtain Z- scores for nutritional status of the children.

Dietary Diversity: the dietary diversity was assessed against the Food and Nutrition technical assistance, FANTA, 9 food groups scale. All the foods were divided into 9 groups. The children were asked to mark the foods they have consumed in previous 7 days. The children consuming more than 6 groups of foods were considered to have good dietary diversity and children consuming 3 or less foods groups were said to have poor dietary diversity. The data collection instrument was translated in local, Kannada language, by lingual expert, and then translated back in English by another lingual expert for clarity.

Data collection procedure:

The data was collected from 02-01-2022 to 12-01-2022. Formal permission was obtained from principals/Head masters, of selected primary schools. The study was explained to all the prospective subjects. The consent form was given to each student with participant information guide sheet, to get it signed from their parent.

All the selected subjects were explained about their role and data to be collected from them. Anthropometric data was collected in a separate room provided by school authority. All the subjects were given the structured questionnaire and dietary diversity tool. The researcher first explained all the items of both the tools and then asked them to fill the options. The participants were instructed to not to discuss with other participants, until submission of their data collection instrument.

Statistical analysis: The collected data was entered in MS Excel sheet and a master sheet was prepared and then transferred to SPSS package 28. The description of sociodemographic data, dietary diversity was done using frequency and percentage distribution. The anthropometric data was entered in WHO ANTHRO plus software and SD-Z scores were calculated for interpretation of nutritional status. The data was tested for Normality with Shapiro Wilk test. The comparison between Nutritional status and Dietary diversity was done using Mann Whitney's Rank sum test. The comparison of level of dietary diversity of rural and urban children was determined by Chi square homogeneity test.

Ethical clearance: ethical clearance certificate was obtained from institutional ethical committee (ref: BVVS/SIONS/IEC/20201-22/62). Formal consent was obtained from the either parent of each participant.

Results:

Description of Socio demographic characteristics: the mean age of urban children was 9.18 ± 2.12 years and mean age of rural children was 9.09 ± 2.22 years. Among 278 urban primary school children 136 (48.9%) were males and 142 (51.1%) were females, 162 (58.3%) were from nuclear family, 179 (64.4%) had upto 5 family members, 104 (37.4%) mothers of subjects had education upto graduation, 232 (83.5%) mothers were housewives, 139 (50%) fathers had education above graduation, 91(34.9%) fathers were in Government job.

Among 274 rural primary school children 147(53.6%) were males and 127(46.4%) were females, 123(44.9%) were from joint family, 87(31.8%) were having 6 to 10 family members, 67(24.45%) mothers did not have formal education and 76 (27.7%) had received only primary level education, 168 (61.3%) mothers were



housewives, 60 (21.9%) were working as daily wage workers, 34 (12.4%) fathers had education above graduation, 167 (60.9%) fathers were daily wage

workers. Table 1, shows the distribution of Study subjects according to their, age, gender and place of residence.

Table 1: Distribution of Urban and Rural children according to Dietary diversity.

$N_1 = 278, N_2 = 274$

Food groups	Urban		Rural	
	F	%	F	%
Cereals	247	99.3	273	99.6
Roots	148	53.2	79	28.8
Vegetables	212	76.3	112	40.9
Fruits	216	77.7	130	47.4
Meat/Chicken	69	24.8	31	11.3
Fish	38	13.7	11	4.0
Milk	203	73.0	217	79.2
Oil/Fat	83	29.9	68	24.8
Sugar/Honey	156	56.1	210	76.6

$\alpha = 0.05$, Abbreviation: F: Frequency, %: Percentage,

There was no significant difference found between dietary diversity of urban and rural children (Table 2). Major portion of urban children (99.3%) and rural

children (99.6%) consumed cereals. Very few in urban area (13.7%) and rural area (4%) consumed fish and meat/chicken (11.3%)

Table 2: Distribution of Urban and Rural children according to their level of dietary diversity.

$N_1 = 288, N_2 = 254$

Dietary Diversity	Place of Residence				Chi square value	P value
	Urban		Rural			
	F	%	F	%		
Poor	81	29.1%	70	25.5%	0.60	0.74
medium	178	64%	191	69.7%		
Good	19	6.9%	13	4.8%		
Total	278	100.0%	274	100.0%		

The dietary diversity (Table 3) was categorized into 3 levels according to number of food groups consumed by the children. Most of the Urban and rural children had medium dietary diversity. Major portion of the urban children (64%) and rural children (69.7%) had

average dietary diversity. There was no significant difference found ($P < 0.74$) in dietary diversity of urban and rural primary school children at 5% level of significance.

**Table 3 Distribution of Urban and Rural children according to their Nutritional status**N₁ = 278, N₂ = 274

Nutritional status		URBAN		RURAL		Mann Whitney's U	P value
		F	%	F	%		
Height for age	Normal	132	47.5	149	54.4	1.75	0.081
	Stunted	102	36.7	74	27		
	Severely stunted	44	15.8	51	18.6		
weight for age	Normal	172	61.9	174	63.5	3.16	0.002*
	Moderately underweight	61	21.9	44	16.1		
	Severely underweight	18	6.5	12	4.4		
	overweight	27	9.7	24	8.8		

$\alpha = 0.01$, * Significant, Abbreviation: F: Frequency, %: Percentage

A significant difference ($P < 0.002$) was found in weight for age of rural children and urban children (Table 3). more rural children were severely underweight (16.1%) compared to urban children (6.5%). Overweight children were more in urban area (9.7%) as compared to rural children (4.4%).

Discussion: It was a cross sectional study to compare the nutritional status and dietary diversity of rural and urban primary school children. The samples were selected by stratified random sampling technique. WHO Anthro plus software was used to determine the Z scores for nutritional status and FANTA tool was used to measure the dietary diversity among them. Many cross-sectional studies have been conducted with similar objective by comparing the nutritional status and dietary diversity of urban and rural children. Ankita Bhagora and associates conducted a cross sectional study to compare the nutritional status of children in urban, rural and tribal areas.^{12,13}

In our study the mean age of urban children was 9.18 ± 2.12 years and mean age of rural children was 9.09 ± 2.22 years. There was no significant difference found between dietary diversity of urban and rural children where as a significant difference was found in their weight for age scores. Our study finding were in consensus with the finding of study conducted by Yoko Horiuchi et al, in which children of urban area

had better nutritional status than rural area¹⁴ Major portion of the urban children (64%) and rural children (69.7%) had average dietary diversity. There was no significant difference found between their height for age. children with overweight were more in urban area (9.7%) as compared to rural area (4.4%). Stunting was more among urban children (36.7%) compared to rural children (27%). Whereas severe stunting was more among rural children (18.6%) compared to rural children (15.8%). Similarly the results of a study by Anurag Srivastava found that 33.3% were wasted and 18.9% were stunted.¹⁵ Medium dietary diversity was found among 64% urban children and 69.7% rural children. The results of a study conducted by Mwaniki et al in Kenya, found that boys had higher rate of stunting than girls.¹⁶ N C Shivaprakash et al, conducted a cross sectional in Mandya and found that the prevalence of stunting was 30.3 % and wasting was 27.9 % among school aged children.¹⁷ Sylvain G. Traoré et al, found that 60% of school aged children had medium dietary diversity.¹⁸ As per a review published by Singh and Sharma, Dietary diversity was less among females compared to their counterpart males. Children from high socioeconomic status had twice dietary diversity compared to children of low socio-economic status. Contradictory to the results of our study, a significant difference was found in the dietary diversity in the results of the study conducted



by Vispute S. et al which suggest that, compared to rural children urban children ate more diverse diet.²⁰

Conclusion: The study results suggest that, there is no difference in dietary diversity of children from urban area and rural area. There is significant difference in nutritional status of primary school children in terms of weight for age, but there was no noticeable difference in height for age of rural and primary school children.

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