Nutritional Status and Dietary Behaviour of Preschool Children in Urban and Rural Settings of Kushtia District

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ABSTRACT

Background & objective: The prevalence of child malnutrition in low-income countries appears to be due to a multitude of factors that include inadequate access to enough food and inappropriate dietary practices. Eating pattern of children are known to vary according to socioeconomic position with rural children being known to experience higher levels of socioeconomic disadvantages compared to their urban counterparts. But little is known about the comparative nutritional status and dietary behaviour of the rural and urban preschool children of Bangladesh. The present study was intended to make a comparative evaluation of nutritional status and dietary behaviour of rural and urban preschool children of Bangladesh.

Methods: This cross-sectional analytical study was conducted in the Department of Community Medicine, Rajshahi Medical College, Rajshahi with data for the study being collected from the selected urban and rural areas of Kushtia District between January 2020 to December 2020. A total of 450 preschool children (3 to 6 years) whose guardians voluntarily consented to allow them to participate in the study were included. Children with known chronic diseases like valvular heart diseases or any other systemic diseases were excluded. Mothers of the children were the respondents in this study. However, fathers in the absence of mothers served as the respondents. On obtaining ethical clearance from the Ethical Review Committee of Rajshahi Medical College, data were collected from the respondents by face-to-face interview using a semi-structured questionnaire. Anthropometric examination (weight & height) was done using a bathroom scale. World Health Organization's Child Growth Chart for children < 5 years of age was used as reference for median to compare the nutritional status of the children between urban and rural areas. For analysis, Z-scores was used which was expressed according to weight for age Z-score (WAZ), height for age Z-scores (HAZ), weight for height Z-scores (WHZ) and BMI for age Z-scores (BAZ) as Standard Deviation classification recommended by WHO. Children below -2 SD of the reference median on any of these scales were considered as undernourished and termed as underweight, stunted and wasted respectively. Children below -3 SD were considered severely undernourished. Other parameters were mild undernutrition (-1.99 to -1.00 SD), normal (-0.99 SD to 1 SD), mild overnutrition (1.01-2 SD), moderate overnutrition (2.01-3SD) and severe overnutrition (> 3 SD).

Result: The present study revealed that 7% of the rural children were moderate to severely wasted as compared to only 1% of the urban children. However, urban children had a significantly higher prevalence of overweight and obesity (16.4%) compared to their rural counterparts (6.2%). Rural children were more often stunted (6.7% children had moderate to severe stunting) than the urban children (3.1% moderately stunted and none were severely stunted). Rural children were more likely to be underweight (7.1% moderate to severely underweight), than their urban counterparts (1.3% moderate to severely underweight). In terms of BMI for age (BAZ) Z-score urban children were more likely to be overweight and obese (16.4%) than the rural children (6.2%). In general, over 20% of the rural children were undernourished (in terms of wasting, stunting and underweight and BMI for age) compared to over 5% of the urban children. In contrast, over 15% of the urban children were over-nourished (in terms of overweight or obesity) as opposed to over 5% of the rural children. Majority (78.7%) of urban preschool children used to taking breakfast regularly as compared to 62.7% of their rural counterparts. The frequency of taking three major meals a day and light meals 2 or > 2 times a day were significantly higher among urban children compared to that among rural children. Taking fast-food 2-3 times per week was reported to be inappreciably higher in urban cohort than that in rural cohort. About half (49.3%) of the urban children reported taking egg and milk daily as compared to 13 and 15% of the rural children respectively. The proportion of fish and meat consumption was also significantly higher in the former group than that in the latter group. While incidence of taking vegetables was almost identical between two groups of children, having fruits daily was much higher in the urban children than that in the rural children.

Conclusion: The study concluded that one in every six rural preschool children is malnourished in terms of wasting stunting and underweight compared to one in every sixteen urban children of similar age and sex. In contrast, one in every six urban children are overweight or obese as opposed to one in every six rural children.

Key words: Nutritional status, dietary behaviour, socioeconomic status, preschool children, rural and urban etc.

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ORIGINAL ARTICLE

INTRODUCTION:

Health and nutrition problems are the result of unsatisfactory food intake or severe and repeated infections, or the combination of both. These conditions are closely linked to inadequate access to food, neglected care of mothers and children, insufficient health services and an unhealthy environment.[1] There is good evidence that adequate nutrition in childhood is important for healthy development as well as for the prevention of many chronic diseases later in life. The persistence of child malnutrition in low-income countries appears to be due to multiple of factors that include uncertain access to enough food and inappropriate dietary practices.[2,3] Previous studies have suggested that the lower prevalence of undernutrition in urban area relative to rural area is due to a series of more favorable socioeconomic condition which, in turn, translate to provision of adequate and appropriate diet and better caring practices for children.[4] However, many children consume diets that are not consistent with dietary guidelines.[5] Having eaten 3 meals a day, fruit or vegetables for a snack, eat more chicken and fish, habit of drinking milk per day are considered healthy eating. Increased intakes of foods that are high in energy, fat, and sugar coupled with sedentary lifestyles (being physically inactive) or low levels of physical activity are major contributors to obesity in adolescents.[6-8]

Moreover, socioeconomic and sociocultural factors such as parents' educational level, ethnicity, time constraints, & mealtime structure including whether families eat together, the source of foods (e.g., schools, restaurants), and watching TV during meals are related to the eating patterns of children and adolescents.[9] Rural people are more likely to experience socioeconomic disadvantages, with lower incomes & lower levels of educational attainment.[10]

The promotion of nutritional status, healthy eating and taking exercise in preschool age group has become a priority in order to promote health, prevent disease, and reduce the incidence of malnutrition. Studies have shown that the prevalence of malnutrition was higher in the rural area than that in urban area. This worrying condition has led to investigate the prevalence of nutritional status and dietary behaviour of urban and rural children in Kushtia district of Bangladesh.

METHODS:

This cross-sectional analytical study was conducted in the Department of Community Medicine, Rajshahi Medical College, Rajshahi. Data were collected in the residential area of Housing Estates, Sadar Thana, Kushtia and Janipur union, Khoksha Thana, Kushtia as urban and rural settings respectively over a period of 12 months from January 2020 to December 2020. Preschool children (3 to 6 years) residing in selected areas of Kushtia district were the study population. Consent was taken from the guardians of the pre-school children, preferably from their mothers. Children having known chronic diseases like valvular heart diseases or any other systemic diseases that may affect their nutritional status were excluded from the study. A total 450 children whose guardians voluntarily consented to allow their children to participate in the study were included. Mothers of the selected children were the respondents in this study. In the absence of mothers, fathers or the primary care givers served as the respondents. On obtaining ethical clearance from the Ethical Review Committee of Rajshahi Medical College, Rajshahi and verbal consent from the guardians or primary care givers, the data collection was done using a semi-structured questionnaire containing the variables of interest (appendix I). The data were collected from the respondents by face-to-face interview of the mothers/fathers or the care givers of the children. Anthropometric examination (weight & height) was done with the help of a bathroom scale.

The new WHO Child Growth Standards for children under 5 years[11] were used as reference for median to compare the differences in the prevalence of malnutrition among the children from the urban and rural areas. For analysis, Z-scores was used which was expressed according to weight for age Z-score (WAZ), height for age Z-scores (HAZ), weight for height Z-scores (WHZ) and BMI for age Z-scores (BAZ) by Standard Deviation classification recommended by WHO.[11] The WHO Anthro software (v 3.2.2) for under five children and ENA for smart 2020 software

for 61 to 71 months of children was used. Children below -2 SD of the reference median on any of these indices were considered as undernourished and termed as underweight, stunted and wasted respectively. Children below -3 SD were considered to be severely undernourished.[11] Other parameters were mildly undernourished (-1.99 to-1.00 SD), normal (-0.99 SD to 1 SD), mild overnutrition (1.01 to 2 SD), moderate overnutrition (2.01 to 3SD) and severe overnutrition (> 3 SD). After proper verification, data were coded and entered into the computer using SPSS/PC programme and were analyzed according to the objectives of the study. Descriptive data were explained with mean and standard deviation. Then the nutritional status (in terms of weight-for-age, stunting and wasting) and the food-behaviours of the two groups (Urban and Rural) were compared using Chi-squared Test (χ^2) with Odds Ratio (OR) and Unpaired t-Test as the data demanded. Level of significance was set at 5% and p-value < 0.05 was considered significant.

RESULTS:

Demographic characteristics of the two groups of residents are shown in table I. The rural children were a bit older than their urban counterparts (p=0.002). While boys and girls were almost equal among rural children, girls were predominant among urban children (p = 0.038). Nearly half (49.3%) of the fathers of rural children were secondary level educated, 27% primary level educated, 16% were illiterate and very few (7.6%) were graduate and higher level educated. The fathers of urban children were predominantly graduate and post graduate level educated (67.1%) followed by secondary level (27.1%) and primary level (5.8%) educated. The fathers of urban wing children were significantly more educated than their rural counterparts (p<0.001). The mothers of urban children were also more literate with half (49.3%) having graduate and higher-level degrees compared to the rural children's mothers (only 3.6% attained graduate & higher-level education) (p < 0.001). While business and farming were the prime occupations of rural fathers, service and business were the prime occupations of urban

fathers (p<0.001). Although mothers in both groups were predominantly housewife, 20% of the urban children's mothers were service-holder as opposed to 7.1% of the rural children's mothers (p < 0.001). Rural children mostly belonged to poor and lower-middle class, but urban children mainly belonged to middle and upper middle-class family (p < 0.001).

Majority of the families of the urban children (88.4%) was of nuclear type as compared to 72.4% of the families of rural children (p < 0.001). While mean family income of the urban cohort was Taka >30000, it was Taka < 18000 for the rural cohort. Majority (86.7%) of the rural families had only one earning member and 11.6% had 2-3 earning members in the family, whereas 75.6% of the urban children's families had one earning member and one-quarter (24.5%) had two earning members in the family (p < 0.001). Two-thirds (66.7%) of the rural families and 71.1% of the urban families had 2-3 children in the family (Table II).

Fig. I shows the nutritional status of the preschool rural & urban children using the indicator weight-for-height (WHZ) z-score. According to WHO growth chart, the majorities of rural and urban children were of normal of weight for their height (-0.99 to 1 SD) (77.6% and 79.3% respectively). Only 4.4%, 2.7% and 9.3% of rural children and 0.5%, 0.5% and 4.1% urban children were severely (<-3SD), moderately (-3 to -2 SD) and mildly wasted (-1.99 to -1 SD) respectively. In terms of overweight (1.01 to 2 SD) and obesity (2.01 to 3SD), urban children demonstrated a significantly higher prevalence of overweight and obesity compared to their rural counterparts (9.8% and 5.7% respectively vs. 4.9% and 1.1% respectively) (p < 0.001). Fig. II depicts the nutritional status of the children in terms of height-for-age (HAZ) Z-score. A significantly higher proportion urban children (80%) had normal HAZ (-0.99 SD to 1 SD) than the rural children had (60.4%). In the rural group 1.8% children were severely stunted (<-3SD), 4.9% moderately (-3 to -2 SD), and 19.6% mildly stunted (-1.99 to -1.00 SD). In contrast, in the urban group, 3.1% moderately stunted (-3 to -2 SD) and 6.2% were mildly stunted (-1.99 to -1.00 SD) (p < 0.001).

Fig. III describes the nutritional status of the rural and urban children in terms weight-for-age (WAZ) Z-score. According to WHO growth chart, nearly 85% of urban children and 75% of rural children were of normal weight (-0.99 to 1 SD). A significantly higher proportion of rural children was underweight (0.9% severely underweight, 6.2% moderately underweight and 14.7% mildly underweight) as compared to their urban counterparts (0.4% severely underweight, 0.9% moderately underweight and 3.1% mildly underweight) (p < 0.001). Fig. IV demonstrates the nutritional status of the children in terms of BMI for age (BAZ) Z-score. As per WHO growth chart, urban children were comparatively overweight and obese with 10.7% being mildly overweight (1.01 to 2 SD), 5.3% moderately overweight (2.01 to 3 SD) and another 0.4% obese (> 3 SD) than the rural children (4.9% being mildly overweight, 1.3% moderately overweight and none being obese) (p < 0.001).

Over three-quarters (78.7%) of the urban children were used to taking breakfast always as compared to 62.7% rural children (p < 0.001). The frequency of taking three major meals a day was significantly higher among urban children (78.7%) compared to that among rural children (47.1%) (p < 0.001). Frequency of taking light meals 2 or > 2 times a day was also much higher among the urban cohort than that in the rural cohort (p < 0.001). Taking fast-food 2-3 times per week was reported to be staggeringly higher in the urban cohort than that in rural cohort (p < 0.001) (Table III).

About half (49.3%) of the urban children reported taking egg daily as compared to 12.9% of the rural children (p < 0.001). Having milk daily was reported to be significantly higher in the former cohort than that in the latter cohort (p < 0.001). Fish and meat consumption was also significantly heterogeneous between urban and rural children with higher consumption being reported in urban cohorts (p < 0.001). While eating vegetables was almost similar between two groups of children (p=0.290), consuming fruits 2-3 times per week or daily was much higher in the urban children than that in the rural children (p < 0.001) (Table IV).

Table I. Distribution of the children by their demographic characteristics (n = 450)

Demographic characteristics	Resident		p-value
	Rural (n = 225)	Urban (n = 225)	
Age (months)#	54.3 ± 9.8	51.3 ± 10.6	0.002
Sex*			
Boys	115(51.1)	93(41.3)	0.038
Girls	110(48.9)	132(58.7)	
Fathers' education*			
Illiterate	36(16.0)	0(0.0)	<0.001
Class 1-5 (Primary level)	61(27.1)	13(5.8)	
Class 6-12 (Secondary level)	111(49.3)	61(27.1)	
Graduate +	17(7.6)	151(67.1)	
Mothers' education*			
Illiterate	42(18.7)	0(0.0)	<0.001
Class 1-5	70(31.1)	10(4.4)	
Class 6-12	105(46.7)	104(46.2)	
Graduate +	8(3.6)	111(49.3)	
Fathers' occupation*			
Service	25(11.1)	128(56.9)	<0.001
Business	69(30.7)	76(33.8)	
Farmer	58(25.8)	0(0.0)	
Day laborer	29(12.9)	2(0.9)	
Others	44(19.9)	19(8.4)	
Mothers occupation*			
House wife	205(91.1)	171(76.0)	<0.001
Service	16(7.1)	45(20.0)	
Business	4(1.8)	3(1.3)	
Others	0(0.0)	6(2.7)	
Socio economic status*			
Poor	123(54.7)	18(8.0)	<0.001
Middle Class	81(36.0)	133(59.1)	
Upper Middle class	21(9.3)	60(26.7)	
Affluent	0(0.0)	14(6.2)	

Figures in the parentheses indicate corresponding **%; *Chi-squared Test (χ^2)** was done to analyze the data; #Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD.**

Table II. Distribution of the children by their family profile

Family profile	Resident		p-value
	Rural (n = 225)	Urban (n = 225)	
Family type*			
Nuclear	163(72.4)	199(88.4)	< 0.001
Joint /extended	62(27.6)	26(11.6)	
Monthly family income (Taka)			
≤15000	124(55.1)	18(8.0)	
15001 – 30000	80(35.6)	135(60.0)	
30001 – 60000	21(9.3)	58(25.8)	
> 60000	0(0.0)	14(6.2)	
Mean ± SD#	17795 ± 10354	30431 ± 12866	<0.001
Earning members in the family*			
1 number	195(86.7)	170(75.6)	<0.001
2 – 3 number	26(11.6)	55(24.5)	
≥4 number	4(1.8)	0(0)	
Number of children in the family*			
1	51(22.7)	65(28.9)	<0.001
2 – 3	150(66.7)	160(71.1)	
≥ 4	24(10.7)	0(0)	

Figures in the parentheses indicate corresponding **%; *Chi-squared Test (χ^2)** was done to analyze the data; #Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD.**
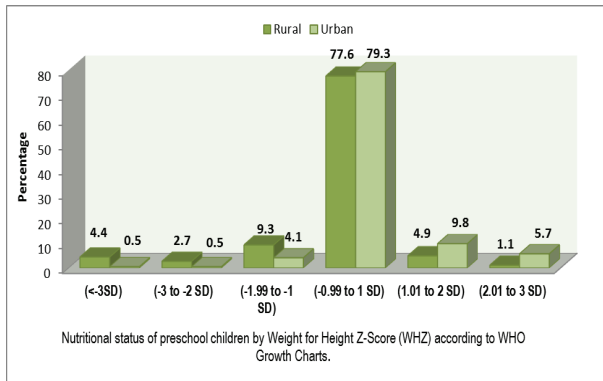
Fig. I: Nutritional status of children by WHZ according to WHO Growth Charts.
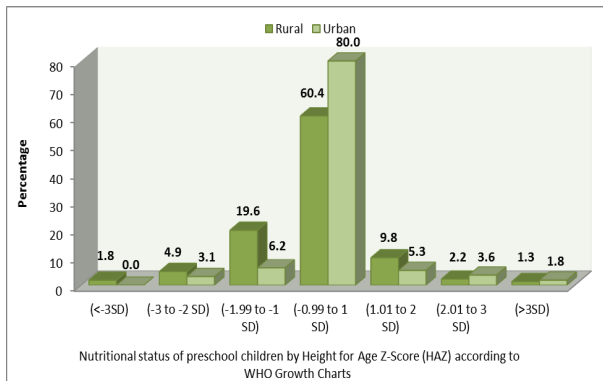

Fig. II: Nutritional status of children by HAZ according to WHO Growth Charts
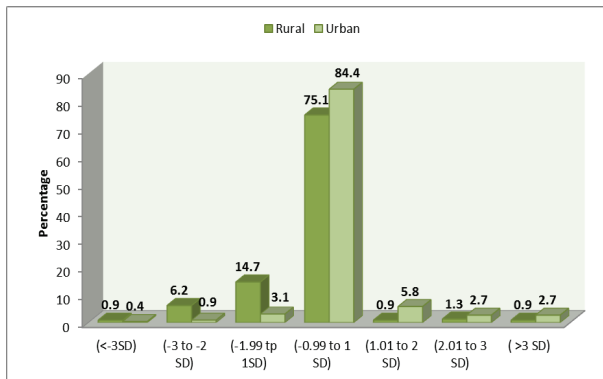

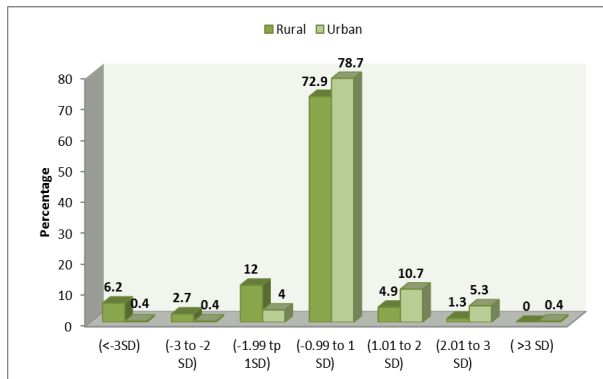**Fig. III: Nutritional status of preschool children by WAZ according to WHO Growth Charts**

Fig. IV: Nutritional status of children by BMI for age Z-Score (BAZ)

Table III. Distribution of respondents by their dietary behavior

Dietary behavior*	Group		p-value
	Rural (n = 225)	Urban (n = 225)	
Taking breakfast			
Never	7(3.1)	3(1.3)	<0.001
Sometimes	46(20.4)	5(2.2)	
Often	31(13.8)	40(17.8)	
Always	141(62.7)	177(78.7)	
Frequency of major meals per day			
1 time	17(7.6)	6(2.7)	<0.001
2 times	102(45.3)	42(18.7)	
3 times	106(47.1)	177(78.7)	
Frequency of light meal per day			
None	15(6.7)	2(0.9)	<0.001
1 time	104(46.2)	73(32.4)	
2 times	97(43.1)	128(56.9)	
> 2 times	9(4.0)	22(9.8)	
Frequency of taking fast foods			
Never	203(90.2)	94(41.8)	<0.001
Occasional	16(7.1)	86(38.2)	
2-3 times per week	3(1.3)	40(17.8)	
Daily	3(1.3)	5(2.2)	

Figures in the parentheses indicate corresponding %; *Chi-squared Test (χ^2) was done to analyze the data

Table IV. Distribution of respondents by frequency of taking different kinds of foods

Types of food items*	Group		p-value
	Rural (n = 225)	Urban (n = 225)	
Frequency of taking egg			
Never	21(9.3)	12(5.3)	<0.001
Occasional	75(33.3)	25(11.1)	
2-3 days per week	100(44.4)	77(34.2)	
Daily	29(12.9)	111(49.3)	
Frequency of drinking milk			
Never	73(32.4)	18(8.0)	<0.001
Occasional	65(28.9)	22(9.8)	
2-3 days per week	52(23.1)	74(32.9)	
Daily	35(15.6)	111(49.3)	
Frequency of eating fish			
Never	45(20.0)	45(20.0)	<0.001
Occasional	83(36.9)	45(20.0)	
2-3 days per week	83(36.9)	101(44.9)	
Daily	14(6.2)	34(15.1)	
Frequency of eating meat			
Never	82(36.4)	33(14.7)	<0.001
Occasional	75(33.3)	34(15.1)	
2-3 days per week	65(28.9)	153(68.0)	
Daily	3(1.3)	5(2.2)	
Frequency of eating vegetables			
Never	14(6.2)	30(13.3)	0.290
Occasional	57(25.3)	48(21.3)	
2-3 times per week	111(49.3)	94(41.8)	
Daily	43(19.1)	53(23.6)	
Frequency of eating fruits			
Never	40(17.8)	9(4.0)	< 0.001
Occasional	85(37.8)	11(4.9)	
2-3 times per week	63(28.8)	114(50.7)	
Daily	37(16.4)	91(40.4)	

Figures in the parentheses indicate corresponding %; *Chi-squared Test (χ^2) was done to analyze the data

DISCUSSION:

Child malnutrition is an important concern in developing countries, for children in developing countries suffer double burden of malnutrition. Studies on comparative nutritional status urban and rural children are lacking. The present study intended to compare the nutritional status and dietary behaviour of the rural and urban preschool children of Kushtia district, therefore carries immense significance.

The present study revealed that 7% of the rural children were moderate to severely wasted as compared to only 1% of the urban children. However, overweight and obesity demonstrated their significant presence in urban children (16.4%) than that in rural children (6.2%). Rural children were more often stunted (6.7% children had moderate to severe stunting) than the urban children (3.1% moderately stunted & none were severely stunted). Rural children were more likely to be underweight (7.1% moderate to severely underweight), than their urban counterparts (1.3% moderate to severely underweight). Overall, over 20% of the rural children were undernourished (in terms of wasting stunting and underweight) compared to over 5% of the urban children. In contrast, over 15% of the urban children were over-nourished (in terms of overweight or obesity) as opposed to over 5% of the rural children. Consistent with these findings, Bharati et al,[12] reported that the prevalence of underweight children in India is significant by higher in rural areas among families with uneducated parents and low standard of living. Gonzalez-Suarez and colleagues[13] in a similar study also showed that a significantly higher proportion of urban children in Filipins were overweight and obese. Aziz and Devi[14] showed that children from urban area were more likely to be overweight and obese rather than underweight in Malaysia. However, they also reported stunting and underweight to exist among urban children of Malaysia.

In contrast, Maddah and associates[15] also showed that most of the children in urban area in Zahedan, Iran was underweight. Sharply contrasting to the findings of the present study, Davis et al[16] demonstrated that prevalence of obesity was higher among the rural children, for they do not engage in physical activity as much as urban children. The orthodox findings among the studies mentioned above might be due to differences in economic status, mothers' knowledge, culture & geographical conditions of the countries and the settings in which the studies were conducted.

Majority (78.7%) of urban preschool children used to taking breakfast regularly as compared to 62.7% of their rural counterparts. The frequency of taking three major meals a day and light meals 2 or > 2 times a day were significantly higher among urban children compared to that among rural children. Taking fast-food 2-3 times per week was reported to be inappreciably higher in the urban cohort than that in rural cohort. About half (49.3%) of the urban children reported taking egg and milk daily as compared to 13 and 15% of the rural children respectively. The proportion of fish and meat consumption was also significantly higher in the former group than that in the latter group. While incidence of taking vegetables was almost identical between two groups of children, having fruits daily was much higher in the urban children than that in the rural children. Smetanina and colleagues[17] in a similar study reported that over 80% of preschool had unhealthy eating habit. About 30% of girls took vegetables at least once daily and 28.4% took fruits daily; of them over 70% were urban residents. However, Turconi and associates[18] demonstrated appreciably low prevalence of unhealthy eating habit (7.5%) among preschool children.

CONCLUSION:

The study concluded that rural children are more often wasted, stunted and underweight as compared urban children of similar age and sex. However, urban children are more likely to be overweight and obese compared to their rural counterparts. Overall, one in every six rural preschool children are malnourished in terms of wasting stunting and underweight compared to one in every sixteen urban children. On the contrary, one in every six urban children are overweight or obese as opposed to one in every six rural children. Majority of urban children possess healthy dietary behaviour as compared to their rural peers. The frequency of taking three

major meals a day and light meals twice or more a day are relatively higher among urban children compared to that among rural children. However, unhealthy food-habit like taking fast-food 2-3 times per week is also no less among the urban children. Half of the urban children used to take egg and milk daily as compared to 13-15% of the rural children. The proportion of fish and meat consumption is also significantly higher in the former group than that in the latter group. While incidence of taking vegetables is almost identical between two groups of children, having fruits daily is much higher in the urban children.

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