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A study of the association between the Diet history and nutritional status of school going children

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Abstract:

***Background**: World Health Organization refers obesity as a global epidemic including children and adults. Low levels of physical activity, TV watching, and unhealthy food habits as well as improper dietary pattern are risk factors for overweight and obesity in children.*

***Objective:** To study the association between diet history and the risk of obesity in school children in Lucknow (**Universe** / population area), U.P., India.*

***Research Methodology: 510** school going children (**sample size**) of the age group 5-18 years from government and private schools of the region were selected by purposive sampling method. Pre-designed and pre-tested questionnaire was used to elicit the dietary history. Height and weight were measured and BMI was calculated. Overweight and obesity were determined. Students who had BMI for age between 85^{Th} and 95^{Th} percentile of reference population were considered as overweight and BMI for age >95^{Th} percentile of reference population were considered as obese.*

***Results:** There is an association between overweight & obesity and diet history / dietary pattern. Prevalence of obesity is found to be 18.6% and that of overweight is 18.4% in the study group.*

***Conclusion:** The prevalence of obesity and overweight (BMI>85th Percentile) is significantly higher in school going children. Physical inactivity and increased intake of high calorie foods are the main causes for high prevalence.*

Key words: Obesity; Overweight, Diet History, Risk factors, Children

1. INTRODUCTION

The issue of Obesity is one of the major complications affecting children and adolescents and is a worldwide nutritional concern. Today, obesity is found in several nations where the major nutritional disorder was malnutrition (De Onis M, Blössner M., 2000). A drastic increase in the prevalence of childhood obesity is associated with many impending medical complications in adulthood like hypertension, atherosclerosis, diabetes mellitus, dyslipidemia, sleep apnoea, and osteoarthritis. (Sharma A, Sharma K, Mathur KP., 2007) In the last twenty years, the prevalence of obesity grown twice in children and tripled in adolescents. The increase in childhood and adolescent obesity generally results in an increase in obesity and overweight among adults. It has a public health consequence as 80% of overweight children become overweight adults. Healthy eating and exercise habits for children and their family results in good health in these patients. Evaluation of obesity in childhood is important due to several reasons. As it helps in preventing obesity and it prevents progression of disease which is associated with obesity in adulthood.

Research Objective

The present study was designed to investigate the association between food consumption pattern that is dietary history and nutritional status among school children.

2. RESEARCH METHODOLOGY

This study was a cross - sectional study conducted in schools from Lucknow city, capital of U.P., India. These schools were selected by using purposive sampling method. The sample size

was 510 school going children of both sexes between age group of 5-18 years from selected government and private schools.

Inclusion criteria:
All students from selected schools in the specific age group, who are willing to participate in the study.

Exclusion criteria:
1. Those children who were absent and whose parents were not willing to give consent.
2. Children on chronic steroid therapy.
3. Children had any chronic disease

Study variables
1. Socio-demographic variables- age, sex, history of any medical illness in the child, food habits, hours of physical activity (exercise/play), time spent on television/computer and relevant personal details and medical history of Family members.
2. Anthropometric measurements –
• Weight - The body weight was measured to a nearest 0.1kg using a weighing scale (Libra weighing machine).
• Height - The height was measured to nearest 0.1 cm by using a non-stretchable measuring tape, which was fixed to the wall vertically using cellophane tape, and by making the child stand with heels, buttocks, shoulders and occiput in apposition with the wall, taking care that there is no bending of knees.
• Waist circumference - was measured with a non-stretchable tape, at the midpoint between the 12th rib and the iliac crest, to the nearest 0.1cm, in a standing position during end-tidal expiration.

Data Collection Procedure: Consent for data collection and examination were obtained from school authorities (principals) prior to study. Information regarding the study and the consent form was send to school authorities as well as to all parents

through school, along with a questionnaire. A structured pre-tested questionnaire was given to each student with the help of teacher and was asked to get filled by respective students.

3. DATA ANALYSIS, INTERPRETATION AND FINDINGS

3.1. Analysis: Crosstabulation: Nutritional Status of the respondents

Table-1 Crosstab: Nutritional Status * Sex Cross tabulation

			Total
Nutritional Status	Underweight	Count	87
		% of Total	17.1%
	Healthy weight	Count	234
		% of Total	45.9%
	Overweight	Count	94
		% of Total	18.4%
	Obesity	Count	95
		% of Total	18.6%
Total		Count	510
		% of Total	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, 17.1% respondents are underweight, 45.9% respondents are healthy weight, **18.4% respondents are overweight & 18.6% respondents have obesity.** This is one of the major findings of the study which is in accordance with the previous studies regarding the prevalence of obesity among children aged between 5 to 18 years.

3.2. Analysis: Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight, Overweight & Obesity**)** and **Diet History** (independent variables).

3.2.1. Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have breakfast in morning (weekdays)** (independent variables).

Table-2 Crosstab: How often do you usually have breakfast in morning (weekdays)

Crosstab									
			How often do you usually have breakfast in morning (weekdays)						Total
			I never have breakfast during weekdays	One day	Two day	Three day	Four day	Five day	
Nutritional Status	Underweight	Count	11	3	4	0	1	68	87
		% of Total	2.2%	0.6%	0.8%	0.0%	0.2%	13.3%	17.1%
	Healthy weight	Count	31	7	12	4	5	175	234
		% of Total	6.1%	1.4%	2.4%	0.8%	1.0%	34.3%	45.9%
	Overweight	Count	13	2	5	2	0	72	94
		% of Total	2.5%	0.4%	1.0%	0.4%	0.0%	14.1%	18.4%
	Obesity	Count	10	1	3	0	1	80	95
		% of Total	2.0%	0.2%	0.6%	0.0%	0.2%	15.7%	18.6%
Total		Count	65	13	24	6	7	395	510
		% of Total	12.7%	2.5%	4.7%	1.2%	1.4%	77.5%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 77.5%** respondents said that they have breakfast in morning (weekdays) **five days a week**, out of which 13.3% respondents are majority in underweight category, 34.3% respondents are majority in healthy weight category, 14.1% respondents are majority in overweight category & **15.7% respondents are majority in obesity category**.

Out of total 510 respondents, 1**2.7% respondents** said that they never have breakfast during weekdays, 2.5% **respondents** said that they have breakfast in the morning only once in a week, 4**.7% respondents** said that they have breakfast only for two days during weekdays, 1.2% **respondents** said that they have breakfast only for three days during weekdays and 1.4% **respondents** said that they have breakfast only for four days during weekdays.

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-3 Chi-Square Tests

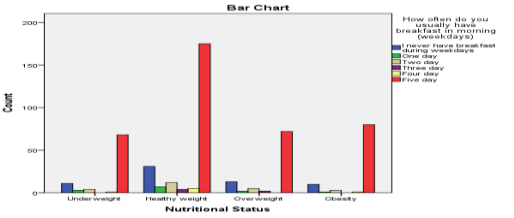
Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.113[a]	15	.872
Likelihood Ratio	12.467	15	.643
Linear-by-Linear Association	1.057	1	.304
N of Valid Cases	510		
a. 14 cells (58.3%) have expected count less than 5. The minimum expected count is 1.02.			

Table-3 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.132	.872
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.872 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.2. Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have breakfast in morning (weekends)** (independent variables).

Table-4 Crosstab: How often do you usually have breakfast in morning (weekends)

Crosstab						
			How often do you usually have breakfast in morning (weekends)			Total
			I never have breakfast during the weekend	I usually have breakfast on only one day of the weekend (Saturday OR Sunday)	I usually have breakfast on both weekend days (Saturday and Sunday)	
Nutritional Status	Underweight	Count	4	13	70	87
		% of Total	0.8%	2.5%	13.7%	17.1%
	Healthy weight	Count	19	30	185	234
		% of Total	3.7%	5.9%	36.3%	45.9%
	Overweight	Count	6	13	75	94
		% of Total	1.2%	2.5%	14.7%	18.4%
	Obesity	Count	2	18	75	95
		% of Total	0.4%	3.5%	14.7%	18.6%
Total		Count	31	74	405	510
		% of Total	6.1%	14.5%	79.4%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 79.4%** respondents said that they usually have breakfast in morning (weekends) on both weekend days (Saturday or Sunday), out of which 13.7% respondents are majority in underweight category, 36.3% respondents are majority in healthy weight category, 14.7% respondents are majority in overweight category & **14.7% respondents are majority in obesity category.**

Out of total 510 respondents, **14.5% respondents** said that they usually have breakfast in morning (weekends) on only one day of the weekend (Saturday or Sunday) and 6.1% respondents said that they never have breakfast in morning (weekends) on weekend days (Saturday or Sunday).

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-5 Chi-Square Tests

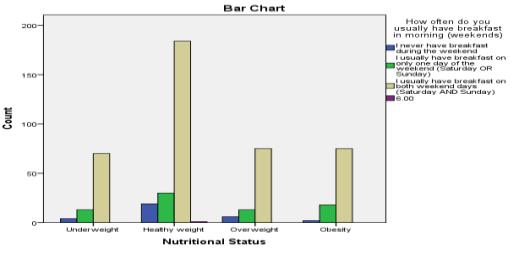
Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.401[a]	9	.595
Likelihood Ratio	8.400	9	.494
Linear-by-Linear Association	.069	1	.792
N of Valid Cases	510		
a. 4 cells (25.0%) have expected count less than 5. The minimum expected count is .17.			

Table-6 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.120	.595
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.595 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.3. Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have lunch in afternoon (weekdays)** (independent variables).

Table-7 Crosstab: How often do you usually have lunch in afternoon (weekdays)

Crosstab									
			How often do you usually have lunch in afternoon (weekdays)						Total
			I never have lunch during weekdays	One day	Two day	Three day	Four day	Five day	
Nutritional Status	Underweight	Count	0	4	1	2	0	80	87
		% of Total	0.0%	0.8%	0.2%	0.4%	0.0%	15.7%	17.1%
	Healthy weight	Count	2	3	3	5	5	216	234
		% of Total	0.4%	0.6%	0.6%	1.0%	1.0%	42.4%	45.9%
	Overweight	Count	0	1	1	1	2	89	94
		% of Total	0.0%	0.2%	0.2%	0.2%	0.4%	17.5%	18.4%
	Obesity	Count	0	0	1	0	1	93	95
		% of Total	0.0%	0.0%	0.2%	0.0%	0.2%	18.2%	18.6%
Total		Count	2	8	6	8	8	478	510
		% of Total	0.4%	1.6%	1.2%	1.6%	1.6%	93.7%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 93.7%** respondents said that they have lunch in afternoon (weekdays) **five days a week**, out of which 15.7% respondents are majority in underweight category, 42.4% respondents are majority in healthy weight category, 17.5% respondents are majority in overweight category & **18.2% respondents are majority in obesity category**.

Out of total 510 respondents, **0.4% respondents** said that they **never have lunch** in afternoon, 1.6% respondents said that they have lunch in afternoon only once in a week, 1.2% respondents said that they have lunch in afternoon only for two days during weekdays, 1.6% respondents said that they have lunch in afternoon only for three days during weekdays and 1.6% respondents said that they have lunch in afternoon only for four days during weekdays.

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-8 Chi-Square Tests

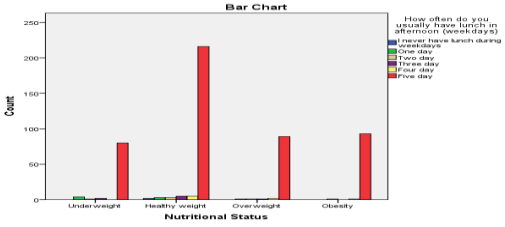
Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.138[a]	15	.515
Likelihood Ratio	17.395	15	.296
Linear-by-Linear Association	5.401	1	.020
N of Valid Cases	510		
a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .34.			

Table-9 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig
Nominal by Nominal	Contingency Coefficient	.164	.515
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.515 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.4 Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight, Overweight & Obesity**)** and **How often do you usually have lunch in afternoon (weekdays)** (independent variables).

Table-10 Crosstab: How often do you usually have lunch in afternoon (weekends)

Crosstab						
			How often do you usually have lunch in afternoon (weekends)			Total
			I never have lunch during the weekend	I usually have lunch on only one day of the weekend (Saturday OR Sunday)	I usually have lunch on both weekend days (Saturday and Sunday)	
Nutritional Status	Underweight	Count	3	2	82	87
		% of Total	0.6%	0.4%	16.1%	17.1%
	Healthy weight	Count	3	11	220	234
		% of Total	0.6%	2.2%	43.1%	45.9%
	Overweight	Count	0	3	91	94
		% of Total	0.0%	0.6%	17.8%	18.4%
	Obesity	Count	0	2	93	95
		% of Total	0.0%	0.4%	18.2%	18.6%
Total		Count	6	18	486	510
		% of Total	1.2%	3.5%	95.3%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 95.3%** respondents said that they usually have lunch in afternoon (weekends) on both weekend days (Saturday or Sunday), out of which 16.1% respondents are majority in underweight category, 43.1% respondents are majority in healthy weight category, 17.8% respondents are majority in overweight category & **18.2% respondents are majority in obesity category.**

Out of total 510 respondents, **3.5% respondents** said that they usually have lunch in afternoon (weekends) on only one day of the weekend (Saturday or Sunday) and 1.2% respondents said that they never have lunch in afternoon (weekends) on weekend days (Saturday or Sunday).

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-12 Chi-Square Tests

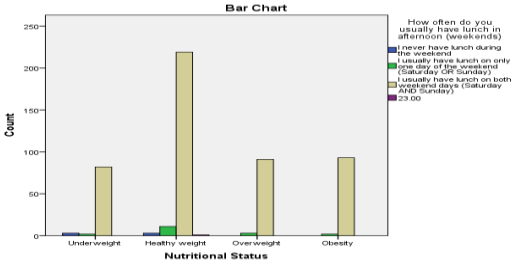
Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.271[a]	9	.413
Likelihood Ratio	10.615	9	.303
Linear-by-Linear Association	.056	1	.813
N of Valid Cases	510		
a. 11 cells (68.8%) have expected count less than 5. The minimum expected count is .17.			

Table-13 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.134	.413
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.413 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.5 Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight, Overweight & Obesity**)** and **How often do you usually have snacks in evening (weekdays)** (independent variables).

Table-14 Crosstab: How often do you usually have snacks in evening (weekdays)

Crosstab									
			How often do you usually have snacks in evening (weekdays)						Total
			I never have a snack during weekdays	One day	Two day	Three day	Four day	Five day	
Nutritional Status	Underweight	Count	21	3	4	6	2	51	87
		% of Total	4.1%	0.6%	0.8%	1.2%	0.4%	10.0%	17.1%
	Healthy weight	Count	38	15	24	21	10	126	234
		% of Total	7.5%	2.9%	4.7%	4.1%	2.0%	24.7%	45.9%
	Overweight	Count	16	5	5	10	4	54	94
		% of Total	3.1%	1.0%	1.0%	2.0%	0.8%	10.6%	18.4%
	Obesity	Count	20	2	7	9	3	54	95
		% of Total	3.9%	0.4%	1.4%	1.8%	0.6%	10.6%	18.6%
Total		Count	95	25	40	46	19	285	510
		% of Total	18.6%	4.9%	7.8%	9.0%	3.7%	55.9%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 55.9%** respondents said that they have snacks in the evening (weekdays) **on five days a week**, out of which 10.0% respondents are majority in underweight category, 24.7% respondents are majority in healthy weight category, 10.6% respondents are majority in overweight category & **10.6% respondents are majority in obesity category**.

Out of total 510 respondents, **18.6% respondents** said that they **never have** snacks in the evening, 4.9% respondents said that they have snacks in the evening only once in a week, 7.8% respondents said that they have snacks in the evening only for two days during weekdays, 9.0% respondents said that they have snacks in the evening only for three days during weekdays and 3.7% respondents said that they have snacks in the evening only for four days during weekdays.

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-15 Chi-Square Tests

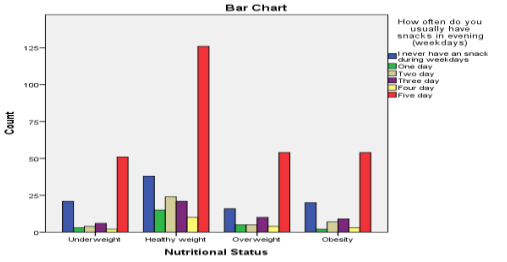
Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.166[a]	15	.741
Likelihood Ratio	11.673	15	.704
Linear-by-Linear Association	.120	1	.729
N of Valid Cases	510		
a. 6 cells (25.0%) have expected count less than 5. The minimum expected count is 3.24.			

Table-16 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.146	.741
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.741 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.6. Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have snacks in evening (weekends)** (independent variables).

Table-17 Crosstab: How often do you usually have snacks in evening (weekends)

Crosstab						
			How often do you usually have snacks in evening (weekends)			Total
			I never have an snacks during the weekend	I usually have an snacks on only one day of the weekend (Saturday OR Sunday)	I usually have an snacks on both weekend days (Saturday AND Sunday)	
Nutritional Status	Underweight	Count	18	14	55	87
		% of Total	3.5%	2.7%	10.8%	17.1%
	Healthy weight	Count	40	55	139	234
		% of Total	7.8%	10.8%	27.3%	45.9%
	Overweight	Count	13	22	59	94
		% of Total	2.5%	4.3%	11.6%	18.4%
	Obesity	Count	16	22	57	95
		% of Total	3.1%	4.3%	11.2%	18.6%
Total		Count	87	113	310	510
		% of Total	17.1%	22.2%	60.8%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 60.8%** respondents said that they usually have snacks in the evening (weekends) on both weekend days (Saturday and Sunday), out of which 10.8% respondents are majority in underweight category, 27.3% respondents are majority in healthy weight category, 11.6% respondents are majority in overweight category & **11.2% respondents are majority in obesity category.**

Out of total 510 respondents, **22.2% respondents** said that they usually have snacks in the evening (weekends) on only one day of the weekend (Saturday or Sunday) and 17.1% respondents said that they never have snacks in the evening (weekends) on weekend days (Saturday or Sunday).

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-18 Chi-Square Tests

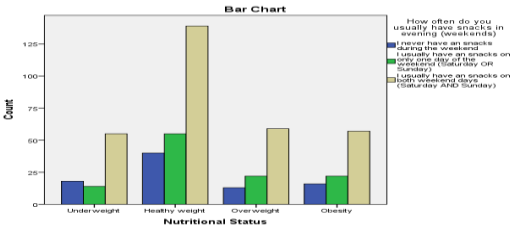
Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.223[a]	6	.780
Likelihood Ratio	3.367	6	.762
Linear-by-Linear Association	.083	1	.774
N of Valid Cases	510		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.84.			

Table-19 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.079	.780
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.780 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.7 Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have dinner at night (weekdays)** (independent variables).

Table-20 Crosstab: How often do you usually have dinner at night (weekdays)

Crosstab									
			How often do you usually have dinner at night (weekdays)						Total
			I never have dinner during weekdays	One day	Two day	Three day	Four day	Five day	
Nutritional Status	Underweight	Count	0	1	1	1	0	84	87
		% of Total	0.0%	0.2%	0.2%	0.2%	0.0%	16.5%	17.1%
	Healthy weight	Count	2	5	0	0	2	225	234
		% of Total	0.4%	1.0%	0.0%	0.0%	0.4%	44.1%	45.9%
	Overweight	Count	0	1	0	0	1	92	94
		% of Total	0.0%	0.2%	0.0%	0.0%	0.2%	18.0%	18.4%
	Obesity	Count	0	0	0	0	0	95	95
		% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	18.6%	18.6%
Total		Count	2	7	1	1	3	496	510
		% of Total	0.4%	1.4%	0.2%	0.2%	0.6%	97.3%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 97.3%** respondents said that they have dinner at night (weekdays) **on five days a week**, out of which 16.5% respondents are majority in underweight category, 44.1% respondents are majority in healthy weight category, 18.0% respondents are majority in overweight category & **18.6% respondents are hundred percent in obesity category**.

Out of total 510 respondents, **0.4% respondents** said that they **never have** dinner at night, 1.4% respondents said that they have dinner at night only once in a week, 0.2% respondents said that they have dinner at night only for two days during weekdays, 0.2% respondents said that they have dinner at night only for three days during weekdays and 0.6% respondents said that they have dinner at night only for four days during weekdays.

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-21 Chi-Square Tests

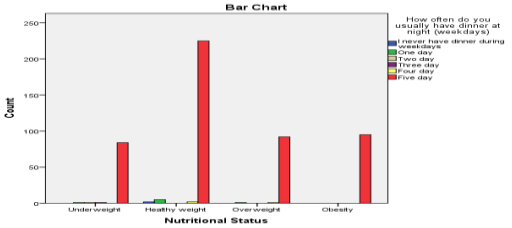
Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.305[a]	15	.362
Likelihood Ratio	16.542	15	.347
Linear-by-Linear Association	2.861	1	.091
N of Valid Cases	510		
a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .17.			

Table-22 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.176	.362
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.362 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



3.2.8 Chi Square Analysis: Analysis of the Association between **Nutritional Status (**Underweight, Healthy weight,

Overweight & Obesity**)** and **How often do you usually have dinner at night (weekends)** (independent variables).

Table-23 Crosstab: How often do you usually have dinner at night (weekends)

Crosstab						
			How often do you usually have dinner at night (weekends)			Total
			I never have dinner during the weekend	I usually have dinner on only one day of the weekend (Saturday OR Sunday)	I usually have dinner on both weekend days (Saturday and Sunday)	
Nutritional Status	Underweight	Count	2	5	80	87
		% of Total	0.4%	1.0%	15.7%	17.1%
	Healthy weight	Count	2	8	224	234
		% of Total	0.4%	1.6%	43.9%	45.9%
	Overweight	Count	0	3	91	94
		% of Total	0.0%	0.6%	17.8%	18.4%
	Obesity	Count	0	2	93	95
		% of Total	0.0%	0.4%	18.2%	18.6%
Total		Count	4	18	488	510
		% of Total	0.8%	3.5%	95.7%	100.0%

Interpretation & Findings

From the above crosstab, it can be said that out of total 510 respondents, **majority of 95.7%** respondents said that they usually have dinner at night (weekends) on both weekend days (Saturday and Sunday), out of which 15.7% respondents are majority in underweight category, 43.9% respondents are majority in healthy weight category, 17.8% respondents are majority in overweight category & **18.2% respondents are majority in obesity category.**

Out of total 510 respondents, **3.5% respondents** said that they usually have dinner at night (weekends) on only one day of the weekend (Saturday or Sunday) and 0.8% respondents said that they **never have dinner** at night on weekend days (Saturday or Sunday).

H0: The two factors are independent.

H1: The two factors are not independent (associated).

Tool Used: Chi Square Test (Analyze → Descriptive Statistics → Crosstabs)

Table-24 Chi-Square Tests

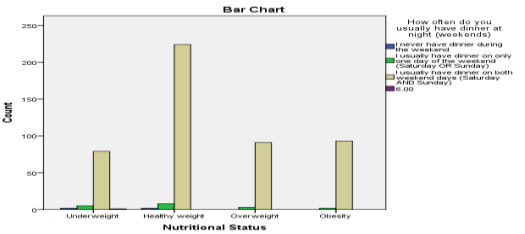
Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.976[a]	9	.277
Likelihood Ratio	10.157	9	.338
Linear-by-Linear Association	1.555	1	.212
N of Valid Cases	510		
a. 11 cells (68.8%) have expected count less than 5. The minimum expected count is .17.			

Table-25 Symmetric Measures

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.145	.277
N of Valid Cases		510	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Interpretation & Findings

From the table we find out that asymptotic significance for Pearson Chi Square comes out to be 0.277 (more than 0.05) so we **accept null hypothesis** at 5% level of significance. Hence it can be concluded that **two variables are not associated**.



CONCLUSION AND DISCUSSION

In the previous researches, the prevalence rate of obesity is between 4 to 30 per cent are reported across different regions in India (Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, Kumar C. K., Sheeba L, Joseph S, Vijay V., 2002) (Kapil U., Singh P., Pathak P, Dwivedi S.N., Bhasin S., 2002) 2002 (A.G. Unnithan, S. Syamakumari, 2008). In the present study out of total 510 respondents, 17.1% respondents are underweight, 45.9% respondents are healthy weight, **18.4% respondents are overweight & 18.6% respondents have obesity.** This is one of the major findings of the study which is also in accordance with the previous studies conducted in India regarding the prevalence of obesity among children aged between 5 to 18 years. The solution to the problem of obesity is now in understanding the issue, measuring and altering the environment which encourages obesity. Evidence from the Cardiovascular Risk in children as the study indicates that persistent inactivity in childhood linked to obesity in adulthood (Yang X. et al, 2006) in developed countries differences in physical activity with sex and age in children has been reported specifically. Present research indicate that proper diet consumption pattern and physical exercise reduces adiposity in both overweight and normal and improves cardiovascular health and wellness, improves attention and memory and thereby the school performance (Strong W.B. et al, 2005). It also confirms the results of previous studies which concluded aforementioned points.

Out of total 510 respondents, 17.1% respondents are underweight, 45.9% respondents are healthy weight, **18.4% respondents are overweight & 18.6% respondents have obesity.** When their response was recorded on the following queries it was found that almost all the overweight and obese respondents agree that they-

- have breakfast in morning (weekdays)

- have breakfast in morning (weekends)
- usually have breakfast on both weekend days (Saturday and Sunday)
- have lunch in afternoon (weekdays)
- have lunch in afternoon (weekends)
- have snacks in evening (weekdays)
- have snacks in evening (weekends)
- have dinner at night (weekdays)
- have dinner at night (weekends)

This dietary history among overweight and obese school going children is certainly alarming; they seldom skip breakfast, lunch or dinner. From the above analysis the reverse pattern can be seen in case of underweight and healthy weight, who sometimes skip breakfast, lunch or dinner.

Findings of research studies show association between dietary pattern / history and obesity in school going children. In this study the frequency of intake of food significantly influenced BMI. Daily consumption of foods among the subjects in the obese category was noticed. Fried foods, in the form of fast foods have become a routine diet in children which increase obesity among them.

RECOMMENDATIONS

In India, obesity and malnutrition often coexist and is certainly the cause of concern. Government should take appropriate measure such as-

- Control of food-related advertisement.
- Awareness programmmes for parents
- Counselling of community to prevent over weight and obesity.
- Encourage children to consume healthier foods,
- Encourage children to consume more fresh fruits and

- Encourage children to consume vegetables and avoiding high fat,
- Encourage children to not consume sweetened snacks.

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