

Original Research Article

# A Study to Seek the Association Between Eating Habits and BMI of Adolescents with A View to Develop and Evaluate Structured Teaching Programme in Terms of Knowledge on Prevention and Control of Obesity in A Selected School of Haryana

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## ABSTRACT

**Introduction:** Most children develop their eating habits and activity pattern during childhood. The transition in nutrition and lifestyle by the popularity of fast foods, soft drinks, sedentary life styles, lack of exercise, increased television watching and computer usage are the common trends which are the causes of overweight and Obesity.

**Materials and Methods:** The research approach adopted for the study was survey for Phase I and evaluative pre-experimental for Phase II. The research design used as descriptive survey for Phase I and pre- experimental one group pre test post test design for Phase II. The setting of the study was Shambhu Dayal Modern School, Sonapat, Haryana, India.

The data were collected with the help of 1). Background data consisted of 15 items seeking information on demographic characteristics of the adolescents. 2). Eating habits questionnaire to assess the eating habits. 3) Standardized weighing machine and height scale. 4). CDC- Body mass index - for - age growth charts (2-20 yrs. boys and girls) to determine body mass index of adolescents. 4) Structured knowledge questionnaire to assess adolescent's knowledge on obesity.

**Results:** The major findings of Phase I of the study revealed that majority i.e. 75.56% of the adolescents had normal weight, 12.38% of adolescents were overweight, 6.35% adolescents were obese whereas only 5.71% were underweight. 57.14% of the adolescents had healthy eating habits whereas 42.86% of the adolescents had unhealthy eating habits. The computed Chi-Square value (84.1), to see the association between the body mass index and eating habits among adolescents is found to be statistically significant. The structured teaching programme was effective in enhancing the knowledge of the adolescents as evident from 't' value which was calculated from pre test and post test scores.

**Keywords:** Eating habits, Adolescent, Overweight, Obesity, Structured teaching programme

## INTRODUCTION

Adolescence is one of the most challenging periods in human development. Physical and psychological changes are taking place and many important issues arise that influence the nutritional wellbeing of adolescents. Eating behaviour that is

learned early in life is maintained in adulthood. Nutritional inadequacies influence not only adolescent's health but also the risk for major chronic diseases in adulthood.<sup>[1]</sup>

Adolescence is a critical period of growth and development, so good nutrition

is essential. During adolescence, the need for most nutrients including energy, protein, vitamins and minerals increases. As appetite is also likely to increase, it is important that food choices are made carefully. It can be tempting at this time to increase the intake of snack foods and fast foods that are high in fat, sugar and salt. [2]

World health organization has described obesity as one of the today's most neglected public health problem.

### **Obesity Facts & Figures: World Health Organisation: Key facts**

Worldwide obesity has nearly doubled since 1980.

In 2014, more than 1.9 billion adults, 18 and older, were overweight. Of these over 600 million were obese.

Most of the world's population lives in countries where overweight and obesity kills more people than underweight.

42 million children under the age of 5 were overweight or obese in 2013.

Overall, about 13% of the world's adult populations (11% of men and 15% of women) were obese in 2014.

In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight.

The worldwide prevalence of obesity more than doubled between 1980 and 2014.

Obesity is preventable.

As per WHO in 2013, 42 million children under the age of 5 were overweight or obese. Once considered a high-income country problem, overweight and obesity are now on the rise in low- and middle-income countries, particularly in urban settings. In developing countries with emerging economies (classified by the World Bank as lower- and middle-income countries) the rate of increase of childhood overweight and obesity has been more than 30% higher than that of developed countries. Children in low- and middle-income countries are more vulnerable to inadequate pre-natal, infant and young child nutrition. At the same time, they are exposed to high-fat, high-sugar, high-salt,

energy-dense, micronutrient-poor foods, which tend to be lower in cost but also lower in nutrient quality. These dietary patterns in conjunction with lower levels of physical activity, result in sharp increases in childhood obesity while under nutrition issues remain unsolved. [3]

Institute for Health Metrics and Evaluation published an article which states that nearly 30% of the world's population – are either obese or overweight, according to a new, first-of-its kind analysis of trend data from 188 countries. The rise in global obesity rates over the last three decades has been substantial and widespread, presenting a major public health epidemic in both the developed and the developing world. Published in *The Lancet* on May 29, the study, "Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013," was conducted by an international consortium of researchers led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. Over the course of the study, rates of overweight and obesity among adults have increased for both men (from 29% to 37%) and women (from 30% to 38%). In developed countries, men had higher rates of overweight and obesity, while women in developing countries exhibited higher rates. Also in developed countries, the peak of obesity rates is moving to younger ages.

### **Key findings:**

More than 50% of the world's 671 million obese live in 10 countries (ranked beginning with the countries with the most obese people): US, China, India, Russia, Brazil, Mexico, Egypt, Germany, Pakistan, and Indonesia.

The US, United Kingdom, and Australia are among the high-income countries with large gains in obesity among men and women.

Over the 33-year period of research, the Middle East showed large increases in obesity. Bahrain, Egypt, Saudi Arabia, Oman, and Kuwait were among the

countries with the largest increases in obesity globally.

In six countries, all in the Middle East and Oceania – Kuwait, Kiribati, the Federated States of Micronesia, Libya, Qatar, and Samoa – the prevalence of obesity for women exceeds 50%. In Tonga, both men and women have obesity prevalence over 50%.

In sub-Saharan Africa, the highest obesity rates (42%) are seen among South African women. <sup>[4]</sup>

The Ministry of Health and Family Welfare released the results from the first phase of the National Family Health Survey (NFHS-4), 2015-16. Even though India battles malnutrition, the country has developed another nutritional problem-obesity. In past 10 years, the number of obese people has doubled in the country. As per the survey conducted by Ministry of Health and Family Welfare (MOHFW), people having Body Mass Index (BMI) more than 25 kilogram per meter square have been considered as obese. Most of the states have experienced sharp rise in the number of obese people. Andhra Pradesh, Andaman and Nicobar, Puducherry and Sikkim have more than 30 per cent of their populations falling under the “obese” category. More than 10 per cent population in Bihar, Madhya Pradesh, Meghalaya, Tripura and West Bengal is obese; doubling since the last National Family Health Survey of 2005-06. <sup>[5]</sup>

The study was undertaken to meet the learning needs of the adolescents. Adolescents can take care of their health when they are provided with good knowledge and right direction. Now- a-days obesity has reached epidemic proportions in the 21st century, with rising rates in both the developed and developing world. So there is an urgent need to find effective prevention and treatment strategies that induce change in the individual, family and at community levels.

#### **OBJECTIVES OF THE STUDY**

1. To assess the eating habits of adolescents.

2. To assess the body mass index (BMI) of adolescents.
3. To seek the association between eating habits and BMI of adolescents.
4. To find the relationship between eating habits and selected demographic variables such as:
  - Age
  - Sex
  - Type of family
  - Educational status of father
  - Educational status of mother
  - Occupation of father
  - Occupation of mother
  - Family income
  - Dietary habits
  - Amount of pocket money
  - Exercise
5. To develop and evaluate the effectiveness of structured teaching programme in terms of knowledge on prevention and control of obesity.

#### **MEHODOLOGY**

##### **THE PRESENT STUDY WAS CONDUCTED IN TWO PHASES.**

Phase-I: To assess the eating habits and to assess the Body mass index among the adolescents (12-17 years).

Phase-II: To determine the effectiveness of structured teaching programme in enhancing knowledge of adolescents on prevention and control of obesity.

##### **RESEARCH APPROACH**

To assess eating habits and BMI of the adolescents among adolescents, a survey approach was conducted in Phase I of the present study.

The experimental approach was considered to be appropriate in the phase - II of the study, to evaluate the effectiveness of structured teaching programme on prevention and control of obesity.

##### **RESEARCH DESIGN**

The research design for present study was:

Phase 1- Descriptive survey.

Phase 2- One group pretest post test design (Pre-experimental)

In the present study, the investigator adopted the knowledge as the measure,

"OK" as experimental variables and "X" as adolescents. the structured teaching programme for

Figure 1: Symbolic representation of Phase II : Pre- experimental design

Group	Pre test (I day)	Treatment(I day)	Post test (VIII day)
Experimental group	OK1	X	OK2

OK1 - Knowledge test to assess the knowledge of adolescents on prevention and control of obesity before the administration of structured teaching programme.

X - Administration of Structured teaching programme on prevention and control of obesity.

OK2 - Knowledge test to assess the knowledge of adolescents on prevention and control of obesity after the administration of structured teaching programme.

### VARIABLES UNDER STUDY

In the present study, the independent variables were:

Phase 1- The background factors

Phase 2- Structured teaching programme

The dependent variables of this study were :

Phase 1 - Body mass index

Phase 2- Eating habits and knowledge regarding prevention and control of obesity.

In present study extraneous variable were mass media, Peer group influence and sedentary life style.

### SETTING OF THE STUDY

The present study was undertaken in:

Phase 1 - Shambhu Dayal Modern School, Sonapat, Haryana

Phase II - Shambhu Dayal Modern School, Sonapat, Haryana

### POPULATION

In the present study, population comprises of adolescents (Boys and girls) of 12-17 years of age from selected school.

### SAMPLE AND SAMPLING TECHNIQUE

#### SAMPLE

In the present study, sample comprises of adolescents (Boys and girls) of 12-17 years of age from selected school.

Phase1

Sample size- 315 adolescents

Phase2

Sample size - 55 adolescents (Those who were overweight and obese. )

### Criteria for selecting the sample:

- Adolescents of 12-17 years of age.
- Adolescents who were willing to participate.
- Adolescents who were present during pretest and posttest
- Sample mortality- 4 samples were not present during pretest and posttest. So there was a sample mortality of 4 samples.

### SAMPLING TECHNIQUE

In the present study, selection of the sample was done by total enumeration sampling for phase I and purposive sampling for phase II.

### DATA COLLECTION TOOLS AND TECHNIQUES

The following tools were used to collect the data:

- A structured tool to collect background data.
- A structured eating habits questionnaire to assess eating habits.
- Standardized weighing machine and height scale.
- Standardized growth charts to classify Body mass index (2-20 yrs. boys and girls)
- Source- CDC- (Centre for disease control and prevention)
- Structured knowledge questionnaire to assess the knowledge on prevention and control of obesity

### DEVELOPMENT OF TOOLS

After extensive review of literature, structured questionnaire was prepared for the tool.

For the development of tool following steps were taken:

- An extensive review of literature.
- Consultation with experts in nursing, pediatrics, nutrition, community medicine.
- Informal talk with adolescents
- Investigator previous experience.

### TRY OUT OF THE TOOL

Pre testing of the eating habits questionnaire was done to ensure the clarity of items, their feasibility and practicability.

For the phase I, after obtaining formal administrative permission, the tools were administered to 20 adolescents. The average time taken for completion of eating habits questionnaire by each individual was around 50-60 minutes.

### STATISTICAL ANALYSIS

#### RESULTS

##### PHASE-I

The data of phase-I of the study is organized under the following sections:-

##### SECTION-I:

#### FINDINGS RELATED TO FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE CHARACTERISTICS OF THE SUBJECTS.

- In the study 54.29% were females and 45.71% were males.
- Majority of the adolescents (40%) were in the age group of 14-15 years.
- Majority (64.13%) belonged to nuclear family and 35.87% stayed in joint families.
- 33.97% of fathers were graduates , 30.16% were having senior secondary education, 17.14% were having high school education , 11.43% were postgraduates and 0.63% were illiterate.
- Maximum i.e. 34.29% of mothers had senior secondary education followed by 23.17% graduates and 3.49% illiterate.
- 30.48% of fathers were on government job followed by 29.21% and 25.21% were on private service and business man respectively. Most of the mothers (85.08%) were housewives. 2.22% of the fathers were not alive.
- 20.63% were having income more than Rs. 50001 and 21.59% had income range of Rs.10001-20000 and only 14.28% had income less than Rs.10000.
- Most of the adolescents i.e. 80% were vegetarian and 6.67% were non vegetarian.

- Most of the adolescents (62.54%) were not getting any pocket money. 14.92% were getting above Rs.300.
- Majority of the adolescents (66.67%) got information on harmful effects of poor eating habits from all sources i.e. parents, teachers, peers and media.
- 28.89% of adolescents were not doing any exercise, 39.05% were doing up to 30 minutes and 8.89% were doing exercise more than 60 minutes.
- Majority i.e. 50.48% were not taking weight and 37.14% were taking monthly weight, 2.54% were taking daily weight.
- 5.71% of the adolescents showed medical problems which includes thalassaemia, backache, headache, stomachache, skin problems, dental problems, low calcium, kidney stone, typhoid.

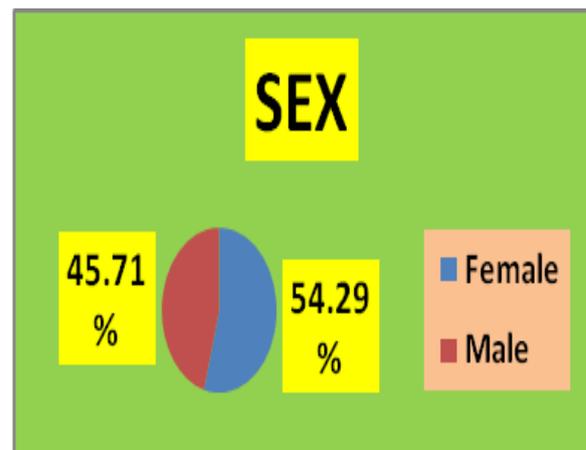


Figure- 2 Pie diagram showing % distribution of adolescents in terms of sex

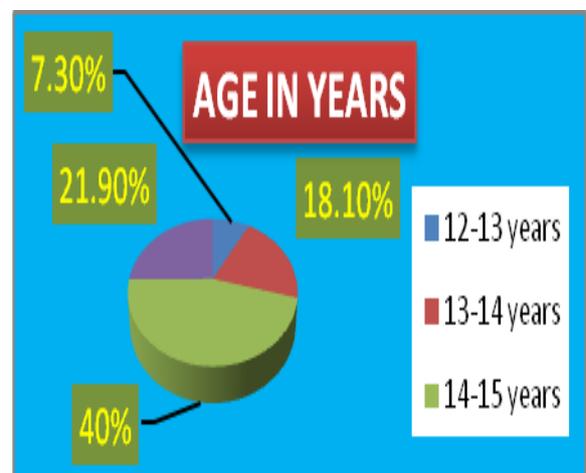


Figure- 3 Pie diagram showing % distribution of adolescents in terms of age.

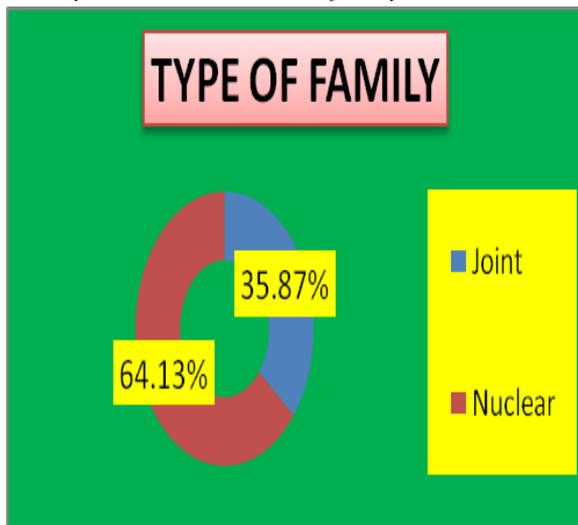


Figure-4 Doughnut diagram showing % distribution of adolescents in terms of type of family

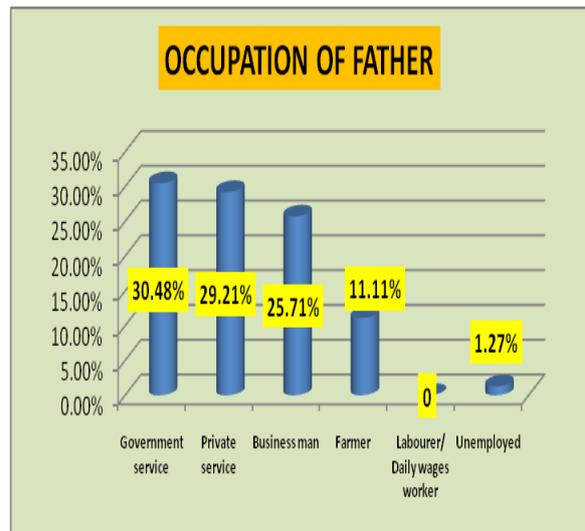


Figure- 7 Cylindrical diagram showing % distribution of adolescent's fathers occupation

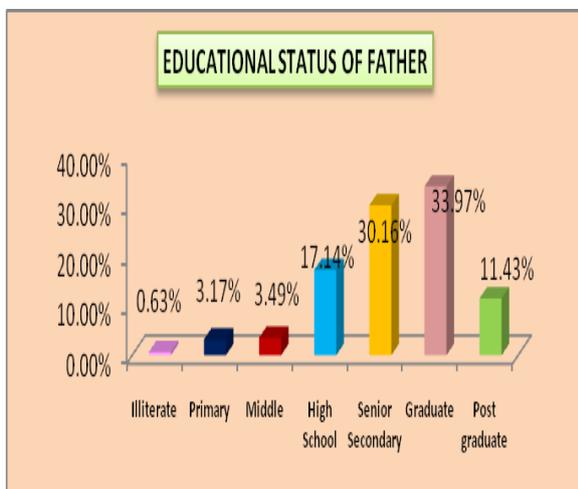


Figure- 5 Bar diagram showing % distribution of adolescent's fathers education

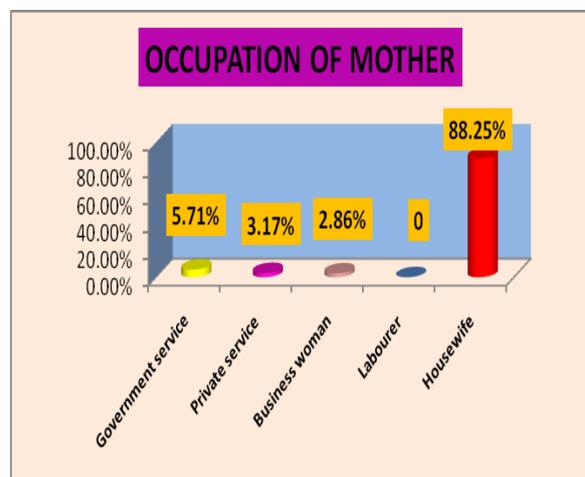


Figure-8 Cylindrical diagram showing % distribution of adolescent's mothers occupation

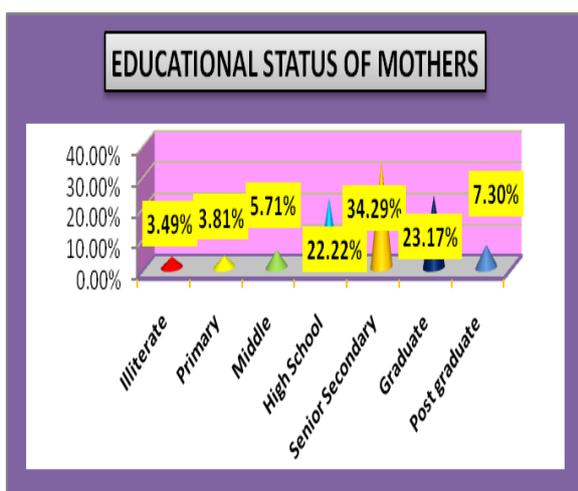


Figure- 6 Conical diagram showing % distribution of adolescent's mother's education.

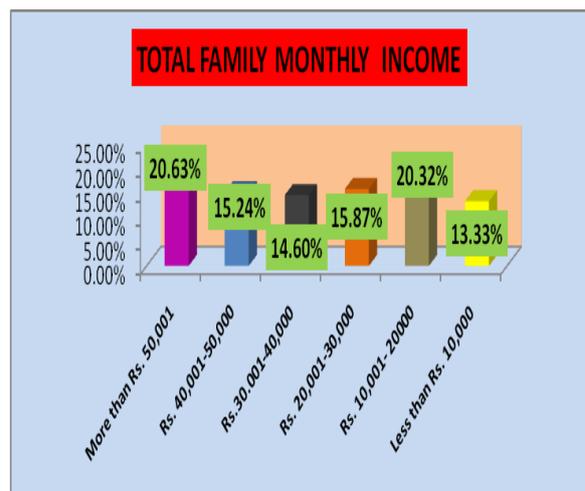


Figure-9 Bar diagram showing % distribution of adolescent's total monthly income

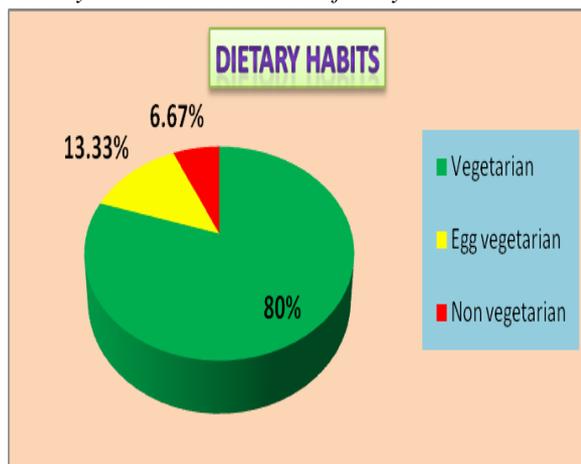


Figure- 10 Pie diagram showing % distribution in terms of adolescent's dietary habits

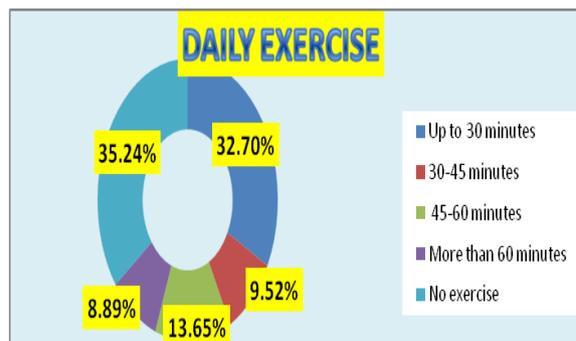


Figure- 13 Doughnut diagram showing % distribution of adolescents in terms of daily exercise

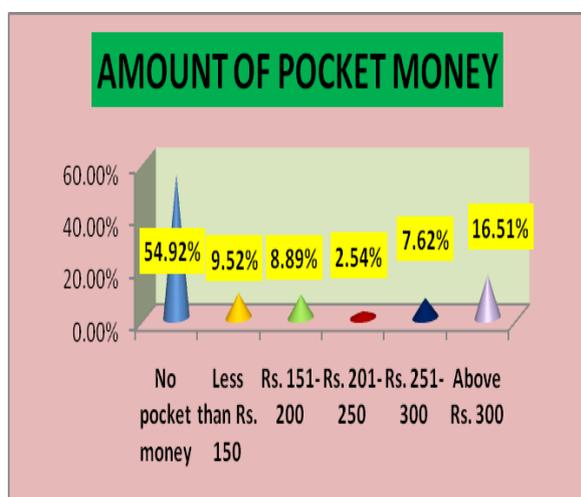


Figure- 11 Conical diagram showing % distribution in terms of adolescent's monthly pocket money

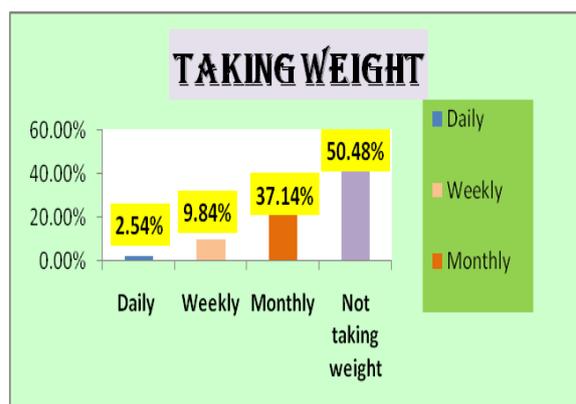


Figure- 14 Bar diagram showing % distribution of adolescents in terms of taking weight

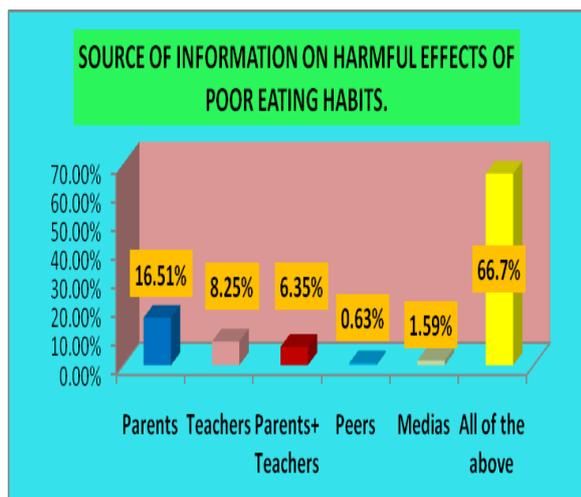


Figure- 12 Bar diagram showing % distribution of adolescent's in terms of source of information on harmful effects of poor eating habits.

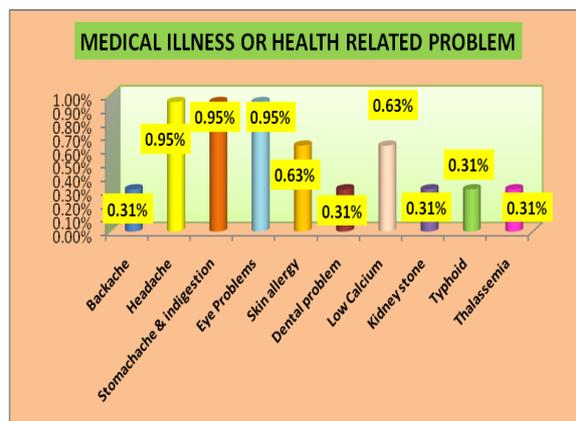


Figure-15 Cylindrical diagram showing % distribution of adolescents in terms of medical problems

## SECTION II: FINDINGS RELATED TO FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATTERN OF BODY MASS INDEX AMONG ADOLESCENTS

This section deals with the distribution of body mass index among the adolescents. Frequency and percentage was computed to describe the pattern of body mass index. The body mass index of adolescents categorized as per CDC norms.

**TABLE-1 FREQUENCY AND PERCENTAGE DISTRIBUTION IN TERMS OF PATTERN OF BODY MASS INDEX AMONG ADOLESCENTS N= 315**

BODY MASS INDEX	BODY MASS INDEX (Boys)		BODY MASS INDEX (Girls)		BODY MASS INDEX (Total)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Under weight	12	8.33%	6	3.51%	18	5.71%
Normal weight	109	75.69%	129	75.44%	238	75.56%
Overweight	13	9.03%	26	15.20%	39	12.38%
Obese	10	6.94%	10	5.85%	20	6.35%

The data represented in table-1 shows majority (75.56%) of the adolescents had normal weight, and only 5.71% were underweight, followed by 6.35% adolescents were obese whereas 12.38% of adolescents were overweight.

### SECTION III:

This section describes the frequency and percentage of eating habits among adolescents. Frequency and percentage was computed to describe the pattern of eating habits. The pattern of eating habits was categorized into: Healthy eating habits and unhealthy eating habits.

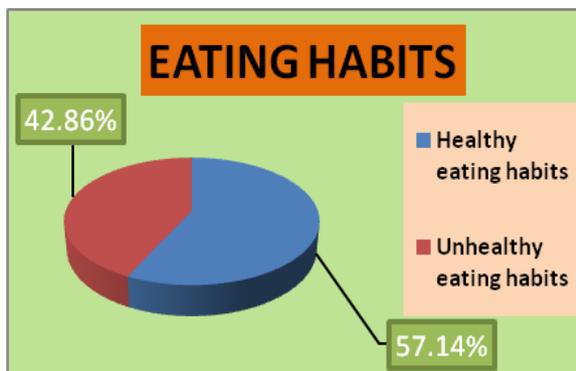


Figure -16 Pie diagram showing % distribution of adolescents in terms of eating habits

**TABLE-2 CHI- SQUARE VALUE SHOWING THE ASSOCIATION BETWEEN BODY MASS INDEX AND EATING HABITS N=315**

CATEGORIES	UNDER WEIGHT	NORMAL WEIGHT	OVER WEIGHT	OBESE	df	Chi-Square Value
Healthy eating habits	5	170	5	0	3	84.1*
Unhealthy eating habits	13	68	34	20		

\* Significant at 0.05 level, df=3,  $\chi^2= 5.991$

The data presented in table-2 depicts that, the computed Chi-Square value (84.1), to see the association between the body mass index and eating habits among adolescents is found to be statistically significant at 0.05 level of significance with degree of freedom 3. Hence the research hypothesis (H1) was accepted and null

### SECTION-IV

#### FINDINGS RELATED TO ASSOCIATION BETWEEN EATING HABITS AND BODY MASS INDEX OF THE ADOLESCENTS

This section shows the association between the body mass index and eating habits. To find out the association between the body mass index and eating habits, the following research hypothesis was formulated:

H1- There is significant association between the body mass index and eating habits of the adolescents at 0.05 level of significance.

The following null hypothesis was stated to test the research hypothesis

H01- There is no significant association between the body mass index and eating habits of the adolescents at 0.05 level of significance.

In order to find out the association between the body mass index and eating habits Chi-Square was computed. Findings presented in table-2.

hypothesis (H01) was rejected. This result indicates that there was association between the body mass index and eating habits among adolescents.

**SECTION V: FINDINGS RELATED TO ASSOCIATION BETWEEN EATING HABITS AND SELECTED VARIABLES.**

This section deals with the association between eating habits and selected variables such as age, sex, education of parents, occupation of parents, type of family, family income, amount of pocket money, dietary habits, exercise .

To determine the significant association between eating habits and selected variables, Chi-Square was computed. Findings are presented in table-3

H2- There is significant association between eating habits and selected variables

- (H2a) Age
- (H2b) sex
- (H2c) Type of family
- (H2d) Education of father
- (H2e) Education of mother
- (H2f) Occupation of father

- (H2g) Occupation of mother
- (H2h) Family income
- (H2i) Dietary habits
- (H2j) Amount of pocket money
- (H2k) Exercise

at 0.05 level of significance.

The following null hypothesis was stated to test the research hypothesis H2

H02- There is no significant association between eating habits and selected variables

- (H02a) Age
- (H02b) Sex
- (H02c) Type of family
- (H02d) Education of father
- (H02e) Education of mother
- (H02f) Occupation of father
- (H02g) Occupation of mother
- (H02h) Family income
- (H02i) Dietary habits
- (H02j) Amount of pocket money
- (H02k) Exercise

at 0.05 level of significance.

**TABLE – 3 CHI- SQUARE VALUE SHOWING THE ASSOCIATION BETWEEN EATING HABITS AND SELECTED VARIABLES N=315**

S. NO.	SELECTED VARIABLES	HEALTHY EATING HABITS	UNHEALTHY EATING HABITS	df	TABLE VALUE	Calculated Chi-Square Value
1.	AGE IN YEARS			4	9.488	3.59 NS
	12-13 years	13	11			
	13-14 years	35	31			
	14-15 years	65	55			
	15-16 years	42	27			
	16-17 years	25	11			
2.	SEX			1	3.841	3.11 NS
	Female	90	81			
	Male	90	54			
3.	TYPE OF FAMILY			1	3.841	0.184 NS
	Joint	64	49			
	Nuclear	116	86			
4.	Educational Status of Father			6	12.592	9.41 NS
	Illiterate	2	0			
	Primary	6	4			
	Middle	9	2			
	High School	37	17			
	Senior Secondary	51	44			
	Graduate	58	49			
	Post graduate	17	19			
5.	EDUCATIONAL STATUS OF MOTHER			6	12.592	4.44 NS
	Illiterate	7	4			
	Primary	4	8			
	Middle	12	6			
	High School	43	27			
	Senior Secondary	61	47			
	Graduate	41	32			
	Post graduate	12	11			
6.	OCCUPATION OF FATHER			4	9.488	2.88 NS
	Government service	54	42			
	Private service	51	41			
	Business man	42	39			
	Farmer	24	11			
	Unemployed	2	2			

Table 3 to be continued...

Table 3 to be continued...						
7.	OCCUPATION OF MOTHER			3	7.815	17.2 *
	Government service	6	12			
	Private service	5	11			
	Business woman	3	10			
	Housewife	166	102			
8.	TOTAL FAMILY MONTHLY INCOME			5	11.070	14.7 *
	More than Rs. 50,001	29	36			
	Rs. 40,001-50,000	22	26			
	Rs.30,001-40,000	19	17			
	Rs. 20,001-30,000	39	14			
	Rs. 10,001- 20000	41	27			
	Less than Rs. 10,000	30	15			
9.	DIETARY HABITS			2	5.991	12*
	Vegetarian	154	98			
	Egg vegetarian	21	21			
	Non vegetarian	5	16			
10.	AMOUNT OF POCKET MONEY (MONTHLY)			5	11.070	29.5 *
	No pocket money	135	62			
	Less than Rs. 150	10	16			
	Rs. 151-200	8	9			
	Rs. 201- 250	3	5			
	Rs. 251-300	9	11			
	Above Rs. 300	15	32			
12.	DAILY EXERCISE			4	9.488	28.8*
	Up to 30 minutes	77	46			
	30-45 minutes	14	16			
	45-60 minutes	36	7			
	More than 60 minutes	18	10			
	No exercise	35	56			

The data given in the table 3 shows that, the computed Chi-square value between eating habits and selected variables such as H2g (Chi-square value =17.2 ), H2h (Chi-square value =14.7 ), H2i (Chi-square value =12 ), H2j (Chi-square value =29.5 ), H2k (Chi-square value =28.8) among adolescents were found to be statistically significant at 0.05 level of significance.

The computed Chi-square value between eating habits and selected variables such as H2a (Chi-square value=3.59), H2b (Chi-square value=3.11), H2c (Chi-square value=0.184), H2d (Chi-square value=9.41), H2e (Chi-square value=4.44), H2f (Chi-square value=2.88) were not found to be statistically significant at 0.05 level of significance.

Therefore the research hypothesis H2 was partially accepted and partially rejected.

## PHASE-II OF THE STUDY ASSESSMENT OF THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME SECTION - I

This section describes the description of sample characteristics in terms of in terms of age, sex, education of parents, occupation of parents, type of family, amount of pocket money, family income, dietary habits, Source of information on harmful effects of poor eating habits, exercise, weight taking, medical problem present of the sample subjects for Phase -II of the study. This sample comprised of the overweight and obese subjects from sample subjects of Phase- I of the study.

Data in table 4 (a) shows that in phase II of the study 63.64% were females and 36.36% were males.

Majority of the adolescents (52.73%) were in the age group of 14-15 years.

Majority (65.45%) belonged to nuclear family and 34.55% stayed in joint families.

41.82 % of fathers were having senior secondary education, 32.73% of fathers were graduates and 14.54% were postgraduates.

Maximum i.e. 40% of mothers had senior secondary education followed by 23.64%

graduates and 20% had high school education.

32.73% of fathers were on government job followed by 30.91% and 30.91% were on private service and business man

respectively. Most of the mothers (78.18%) were housewives.

29.09 % were income more than Rs. 50001 and 20% had income range of Rs.10001-20000 and only 9.10% have income less than Rs.10000.

**TABLE -4 (a)** Frequency and percentage distribution of adolescents (12-17 years) by their demographic characteristics: (sex, age, education of parents, occupation of parents, type of family & family income). N=55

S. NO.	SAMPLE CHARACTERISTICS	FREQUENCY	PERCENTAGE
1.	SEX		
1.1	Female	35	63.64%
1.2	Male	20	36.36%
2	AGE IN YEARS		
1.1	12-13 years	1	1.82%
2.2	13-14 years	8	14.54%
2.3	14-15 years	29	52.73%
2.4	15-16 years	12	21.82%
2.5	16-17 years	5	9.09%
3.	TYPE OF FAMILY		
3.1	Joint	19	34.55%
3.2	Nuclear	36	65.45%
4.	EDUCATIONAL STATUS OF FATHER		
4.1	Illiterate	0	0
4.2	Primary	1	1.82%
4.3	Middle	1	1.82%
4.4	High School	4	7.27%
4.5	Senior Secondary	23	41.82%
4.6	Graduate	18	32.73%
4.7	Post graduate	8	14.54%
5.	EDUCATIONAL STATUS OF MOTHER		
5.1	Illiterate	0	0
5.2	Primary	3	5.45%
5.3	Middle	2	3.64%
5.4	High School	11	20%
5.5	Senior Secondary	22	40%
5.6	Graduate	13	23.64%
5.7	Post graduate	4	7.27%
6.	OCCUPATION OF FATHER		
6.1	Government service	18	32.73%
6.2	Private service	17	30.91%
6.3	Business man	17	30.91%
6.4	Farmer	3	5.45%
6.5	Labourer/ Daily wages worker	0	0
6.6	Unemployed	0	0
7.	OCCUPATION OF MOTHER		
7.1	Government service	2	3.64%
7.2	Private service	3	5.45%
7.3	Business woman	7	12.73%
7.4	Labourer/ Daily wages worker	0	0
7.5	Housewife	43	78.18%
8.	TOTAL FAMILY MONTHLY INCOME		
8.1	More than Rs. 50,001	16	29.09%
8.2	Rs. 40,001-50,000	10	18.18%
8.3	Rs.30,001-40,000	4	7.27%
8.4	Rs. 20,001-30,000	9	16.36%
8.5	Rs. 10,001 - 20000	11	20%
8.6	Less than Rs. 10,000	5	9.10%

Data in table 4(b) shows that most of the adolescents i.e. 81.82% were vegetarian.

Most of the adolescents (61.82 %) did not receive any pocket money. 20% received above Rs.300.

Majority of the adolescents (76.36%) have received information on harmful effects of

poor eating habits from all sources i.e. parents, teachers, peers and media.

34.55% of adolescents were not doing any exercise, 43.64 % were doing up to 30 minutes.

Majority i.e. 60% were not taking weight and 27.27% were taking monthly weight

5.5% of the adolescents showed medical problems and low calcium problems which include headache, skin

**TABLE -4 (b)** Frequency and percentage distribution of adolescents(12-17 years) by their demographic characteristics: (Dietary habits, amount of pocket money, Source of information on harmful effects of poor eating habits, exercise ,weight taking & medical problem present.) N=55

S. NO.	SAMPLE CHARACTERISTICS	FREQUENCY	PERCENTAGE
9.	DIETARY HABITS		
9.1	Vegetarian	45	81.82%
9.2	Egg vegetarian	7	12.73%
9.3	Non vegetarian	3	5.45%
10.	AMOUNT OF POCKET MONEY (MONTHLY)		
10.1	No pocket money	34	61.82%
10.2	Less than Rs. 150	6	10.91%
10.3	Rs. 151-200	0	0
10.4	Rs. 201- 250	1	1.82%
10.5	Rs. 251-300	3	5.45%
10.6	Above Rs. 300	11	20%
11.	SOURCE OF INFORMATION ON HARMFUL EFFECTS OF POOR EATING HABITS.		
11.1	Parents	8	14.55%
11.2	Teachers	3	5.45%
11.3	Parents+ Teachers	2	3.64%
11.4	Peers	0	0
11.5	Media	0	0
11.6	All of the above	42	76.36%
12.	DAILY EXERCISE		
12.1	Up to 30 minutes	24	43.64%
12.2	30-45 minutes	6	10.91%
12.3	45-60 minutes	3	5.45%
12.4	More than 60 minutes	3	5.45%
12.5	No exercise	19	34.55%
13.	WEIGHT TAKING		
13.1	Daily	0	0
13.2	Weekly	7	12.73%
13.3	Monthly	15	27.27%
13.4	Not taking weight	33	60%
14.	MEDICAL ILLNESS OR HEALTH RELATED PROBLEM		
	Total participants with medical problems	3	5.5%
14.1	Headache	1	0.02%
14.2	Skin allergy	1	0.02%
14.3	Low Calcium	1	0.02%

## SECTION- II

This section presents the finding related to mean, median and standard deviation of pre test and post test knowledge score of adolescents about prevention and control of obesity. This was obtained from the structured knowledge questionnaire administered to the adolescents during the data collection period. Pre test and post test knowledge scores are tabulated in the master data sheet.

**TABLE -5:** MEAN, MEDIAN AND STANDARD DEVIATION OF PRE TEST AND POST TEST KNOWLEDGE SCORE OF ADOLESCENTS N=55

Knowledge Test	Mean	Median	SD
Pre test	21.40	22	1.84
Post test	26.64	27	1.24

Maximum Score = 30

The data in the table-5 indicates that the mean post test knowledge score (26.64)

was higher than the mean pre test knowledge score (21.40). The median of post test knowledge score (27) was higher than the median of pre test knowledge score (22) indicating an increase in knowledge. The standard deviation of post test knowledge score (1.24) was lower than the standard deviation of pre test knowledge score (1.84) indicating that the group became more homogeneous in terms of their knowledge in post -test.

## SECTION - III

This section describes the findings related to the evaluation of effectiveness of structured teaching programme in terms of significant difference in pre test and post test knowledge regarding prevention and control of obesity. The pre test knowledge scores obtained through structured questionnaire

were described and analyzed using descriptive and inferential statistics.

To find out the significance of mean difference between pretest and post test knowledge scores, the following research hypotheses was formulated:

H3 - The mean post test knowledge scores of adolescents after administration of structured teaching programme on prevention and control of obesity is significantly higher than the mean pretest knowledge scores as measured by a structured knowledge questionnaire at 0.05 level of significance.

The following null hypotheses was stated to test the research hypotheses H3

H03 - The mean post test knowledge scores of adolescents after administration of structured teaching programme on prevention and control of obesity is not significantly higher than the mean pretest knowledge scores as measured by a structured knowledge questionnaire at 0.05 level of significance.

In order to determine the significance of difference between means of pre test and post test knowledge scores, "t" value was computed for correlated groups. Mean, median and standard deviation of difference, standard error of mean difference of pre-test and post- test knowledge scores were calculated. These are presented in table -6

**TABLE NO- 6** MEAN, MEAN DIFFERENCE, STANDARD DEVIATION OF DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE FROM PRE TEST TO POST TEST KNOWLEDGE SCORES AND "t" VALUE ON PREVENTION AND CONTROL OF OBESITY OF ADOLESCENTS. N= 55

Knowledge Test	Mean	Mean Difference	SDD	SEMD	t value
Pre test	21.40	5.24	0.6	0.32	16.48*
Post test	26.64				

\*Significant at 0.05 level of significance at df (54) = 2.0049.

The data presented in table 6 shows that the mean post test knowledge score (26.64) was higher than the mean pre test knowledge score (21.40) with a mean difference of (5.24). The obtained mean difference was found to be statically significant as evident from 't' value 16.48

for degree of freedom 54 at 0.05 level of significance.

Therefore the obtained mean difference was a true difference and not by chance so the research hypothesis H3 was accepted. This shows that the structured teaching programme was effective in enhancing the knowledge of the adolescents.

## DISCUSSION

This section presents the major findings of the study discussed with reference and in relation to similar studies conducted by other researchers. The study intended to seek the association between eating habits and body mass index of adolescents with a view to develop and evaluate the effectiveness of structured teaching programme in terms of knowledge on prevention and control of obesity.

### Findings related to the BMI of the adolescents:

The findings of the present study indicated that 12.38% of adolescents were overweight followed by 6.35% adolescents were obese whereas only 5.71% were underweight.

These findings were similar with the findings of Gupta Rajesh et.al.(2013) who conducted a community based study to assess the prevalence of overweight and obesity and its socio demographic correlates among adolescents of an urban area of Delhi. Prevalence of overweight and obesity was 15.1% and 7.2% respectively. [6]

These findings were also consistent with the findings of study conducted by Prasanna Kamath B.T. et. al.(2012) to assess the prevalence of overweight and obesity among school going children and the factors responsible for the same. The prevalence of overweight was 10% and obesity was 5% among 761 adolescents studied. [7]

### Findings related to association of eating habits and BMI of adolescents:

The present study findings indicated that there was association between the body mass index and eating habits among adolescents as evident by Chi-Square value

84.1 at 0.05 level of significance with degree of freedom 3.

Similar results were found in the study conducted by Kuźbicka K, Rachoń D.(2013). The study revealed that bad eating habits as the main cause of obesity among children. Today's lifestyle promotes the development of obesity. The lack of physical activity, sedentary lifestyle and energy-rich diet are the main causes of an excess body fat accumulation. The examples of such bad eating habits are: snacking highly processed and calorie-rich foods between meals eating in front of the TV screen, skipping breakfasts, drinking sugar-sweetened beverages, "eating out" frequently and "emotional eating". Bad eating behaviours are crucial factors for the development of obesity. [8]

The findings of the study are also supported by a cross-sectional descriptive study conducted by Tarek Tawfik Amin et. al. (2008). The study revealed that missing and or infrequent intake of breakfast at home, frequent consumption of fast foods, low servings per day of fruits, vegetables, milk and dairy products, with frequent consumption of sweets/candy and carbonated drinks were all predictors of obesity and overweight among the schoolchildren studied. [9]

#### **Findings related to the association between eating habits and selected variables:**

The present study also showed that the significant association was found between eating habits and the variables such as occupation of mother, family income, dietary habits, pocket money and exercise.

The findings were consistent with study conducted by M Shashidhar Kotian et. al. (2010), prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. The analysis revealed that the risk of overweight was two times higher among the adolescents of high SES, 21 times higher among those participating < two hour/week in any type of physical activity, 7.3 times higher among those who reported watching

television and playing games on the computer for  $\geq$  four hours/day, and 5.6 times higher among those who ate chocolates daily in addition to a normal diet. [10]

Similar findings were also shown in a study conducted by E A Spencer, P N Appleby, G K Davey and T J Key. (2003). They done a Cross-sectional analysis of self-reported dietary, anthropometric and lifestyle data. They found Fish-eaters, vegetarians and especially vegans had lower BMI than meat-eaters. [11]

Another study conducted by Taha and Marawan ( 2015) showed that the most important predictors to overweight and obesity in the students were eating restaurant food at least twice weekly, TV watching more than 2 hours per day, mother employment and pocket money. [12]

#### **Findings related to the effectiveness of structured teaching programme:**

The findings of the study also showed that the mean post test knowledge score was higher than the mean pre test knowledge score. This shows that the structured teaching programme was effective in enhancing the knowledge of the adolescents.

The findings were similar with the findings of Trupti Rekha Swain (2015) to assess the prevalence of obesity and its relationship with selected factors with a view to develop and evaluate the effectiveness of awareness programme on prevention and control of obesity among adolescent children in terms of knowledge and attitude. The findings revealed that the awareness programme was effective in enhancing the knowledge and changing the attitude of adolescents regarding prevention and control of obesity as evident from significant 't' value which was calculated from pre test and post test scores. [13]

#### **CONCLUSION**

The following conclusions were drawn from the findings of the study.

Suman Dhaniya. A Study to Seek the Association Between Eating Habits and BMI of Adolescents with A View to Develop and Evaluate Structured Teaching Programme in Terms of Knowledge on Prevention and Control of Obesity in A Selected School of Haryana

12.38% of adolescents were overweight, followed by 6.35% adolescents were obese. 57.14% of the adolescents had healthy eating habits whereas 42.86% of the adolescents had unhealthy eating habits. There was significant association between the body mass index and eating habits of the adolescents. There was significant association between eating habits and the variables such as (i.e. occupation of mother, family income, dietary habits, amount of pocket money and exercise) with eating habits among the adolescents. There was a deficit in knowledge regarding prevention and control of obesity among adolescent. There was a significant difference in level of knowledge of adolescents after administration of structured teaching programme.

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