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Assessment of nutritional status and efficacy of nutrition education amongst adolescent girls of rural area in Jaipur city

Sraddhanjali Saha and Damini Soni

Abstract

One of the most complicated phases of the human life cycle is adolescence. A person needs additional care and consideration during this time since their body needs more nutrition than usual. The current study was carried out with the objectives to assess the nutritional status and eating behaviours, dietary patterns, and physical activities of the adolescent girls. To provide nutritional based education, dietary counselling was done to improve their dietary habits and examine the knowledge about nutrition after assessment. On the whole, there are 22 blocks in Jaipur district, out of which only one block named *Achrol* was chosen purposively for the study. From the selected blocks there are 2 government school in *Achrol* village and one of them was selected namely "Rajakiya Uccha Madhyamik Vidyalaya". Random sampling techniques were used to select all the respondents. The study was carried out on 80 adolescent girls belonging to 11-19 years of age group.

For gathering appropriate data, a well-structured interview schedule was created, in order to gather data for the anthropometric assessment. Through an interview schedule, information regarding eating habits, dietary patterns, physical activity, and knowledge about food and various diseases was gathered. The 3 days, 24 hour dietary recall approach was used to assess the pattern of food consumption.

Pre- and post-tests were done to evaluate the effect of adolescent girls' nutritional awareness. A well-organized interview schedule with knowledge testing on numerous topics was created. To make defensible inferences, the qualitative and important data were coded, tallied, and collated.

Major Findings

Background information of the respondents: The study revealed that maximum of subjects belonged to Hindu religion that were 95 percent. Remaining 5 percent were Muslims. Out of 80 respondents majority (83.75%) of the subjects belonged to joint family, (11.25%) belonged to nuclear family and (5%) from extended family.

Nutritional status of respondents

Anthropometric measurement: Data was resulted by identifying mean height and mean weight of all the respondents and then calculating BMI. The results revealed that out of 80 respondents (32.3%) were underweight, (21.25%) were pre-obese, (7.5%) were obese and only (38.75%) were in normal weight. The mean±SD of height was 157.7±0.159 and weight was 51.6±11.34.

Average dietary assessment of 3 days 24 hours dietary recall of all respondents according to food groups: Data resulted mean and SD of all adolescent girls were 3.51±0.10 were consuming cereals and pulses, 1.05±0.11 adolescent were consuming fruits and vegetables, 0.64±0.01 consuming milk and milk products, 1.30±0.07 respondents consuming fats and oils, 0.05±0.01 respondents consuming meat and poultry.

Dietary intake and food habits: Out of 80 respondents it was revealed that (88.75%) affected there meal size in presence of family and friends, others (11.25%) were not affected. (75%) of respondents skipped there meal and most of them, that is (51.25%) adolescent girls skipped there lunch. It was also noticed that (41.25%) respondents were lacto vegetarian, (28.75%) were vegetarian, (11.25%) were ova vegetarian, (6.25%) were lacto ova vegetarian and (12.5%) were non vegetarian. Special diets revealed were only (16.25%) and others were not restricted.

Imparting nutrition education and monitoring the impact of nutrition education of all respondents: With the aid of several educational techniques like leaflets, posters, and films, a nutrition education package was given. Following the nutrition lecture, it was found that the majority of the respondents had gained the necessary nutritional knowledge.

Assessment of pre and post positive responses: Based on the findings of this study, the majority of respondents were unaware of nutritional facts prior to receiving nutrition education and dietary guidance. In pre responses, positive responses of total questions were 82.75% and after providing nutritional education positive responses of total questions were 93.74%. Education about nutrition had a positive effect.

Keywords: Nutritional status, nutrition education, adolescent girls, rural area

Introduction

The adolescent years are also known as the "growing-up years" or the "stage between childhood and adulthood." The Latin word "adolescere," which means "grow to maturity,"

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where the English word "adolescence" originates. Adolescence is the time when people grow the second fastest, after infancy. Adolescents are defined as those between the ages of 10 and 19. From childhood until adulthood, there is a time of significant biological, emotional, cognitive, physical, and social development.

India has the largest number of adolescents in the world (243 million), followed closely by China (207 million) (Dave *et al.*, 2017) ^[1]. Almost 21.4% of Indians are believed to be adolescents (Nair *et al.*, 2017) ^[2].

According to NNMB (2006), Iron Deficiency (ID) in teenagers has a negative impact on their health and physical stamina. When the need for iron is at its highest, between both the ages of 12 and 15, the prevalence is at its highest. More than 50% of the girls in this age range were found to be anaemic. According to a survey on the inadequate nutrient intake of teenagers in India, more than 70% of females consumed less iron than the recommended daily allowance.

In Jaipur according to the survey of NFHS (2019-2021), prevalence of anaemia not only increased among children and women but also rises among men as well.

A comparison of survey of 2019-21 and 2015-16 shows that for children aged 6 – 59 months, the prevalence increased from 58.6% to 67.1% great jump of 8.5 5. In women from 15-19, years anaemia rises from 54.1% to 59.1%. The rising cause

of anaemia among adolescents and young women increases the risk and complication of pregnancies. In pregnant women 15-49 years women according to a survey of NFHS it rose to 52.2% from 50.4%. In non-pregnant women 15 – 49 years, it rises from 53.2% to 57.2% (NFHS, 2021)

Objective of the study

- To assess the nutritional status of the adolescent girls
- To study the eating behaviours and dietary patterns among girls
- To find out the physical activities of adolescent girls.
- Provide a nutrition based education using various research tools by assessing the nutritional status.
- Statistical analysis of data based on questionnaires.

Materials and Methods

Research design

This research was a Survey method.

Locale of the study

On the whole, there are 61 government school in Jaipur Amber tehsil, out of which only one school namely Rajakiya Uccha Madhyamik Vidyalaya, Achrol was chosen for the study.

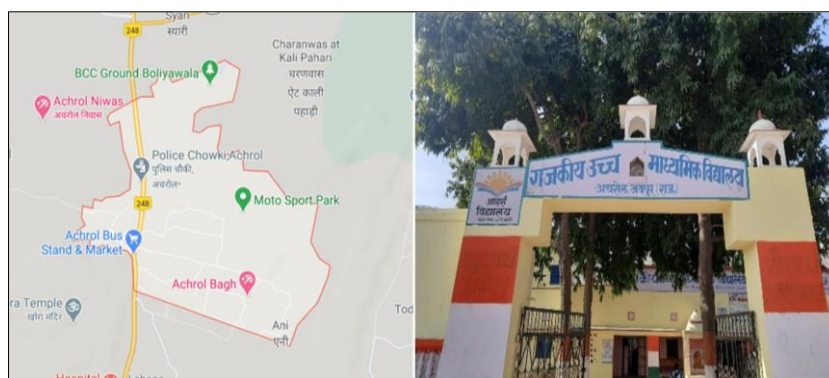


Fig 1: Achrol block (Rajakiya Uccha Madhyamik Vidyalaya)

Selection of the respondents

Sample: Adolescent girls of age group (10 to 19 years) from class 8 to 12 were selected as the sample for the study.

Sample Size: For the study, 80 students were chosen as the sample, and only girls were considered.

Sampling Method: The random sampling approach was used to choose the sample for the investigation.

Development and validation of research tool, interview schedule and data collection

Collection of general information: A well-structure scheduled was created utilizing criteria including age, caste, religion, types of family, occupation of family, and educational background for the collection of general information.



Fig 2: Gathering general information of respondents

Nutritional assessment of subjects

- **Anthropometric measurement:** A person's status can be determined in large part by their anthropometric measurements. Height, weight, and BMI are the anthropometric parameters that are most frequently used to determine nutritional status.
- **Weight:** A computerised weighing machine was used to weight the chosen adolescent girls. The weights of the respondents were recorded three times, with the average of the three readings used as the final measurement.



Fig 3: Evaluation of the weight

- **Height:** The height of the chosen individuals was measured with an inch tape. Three height measurements were collected, and the average was used as the final measurement.



Fig 4: Determining the interviewers height

- **Body Mass Index (BMI) (Kg/m²):** Body mass index, or BMI, is a metric that calculates a person's body fat percentage based on their height, weight, and age. $BMI = \text{weight (in kg)} / \text{height (in m)}^2$.
- **Dietary survey** -Interview schedules were used to gather data on dietary intake, eating habits, and food knowledge. The individuals' food consumption was evaluated using a three-day, 24-hour recall approach.

Development of nutrition education and package: A nutritional education package for the current study was created with the aid of food group tables, charts, posters, audio-visual aids, and lectures.



Fig 5: Preparation of various research tools

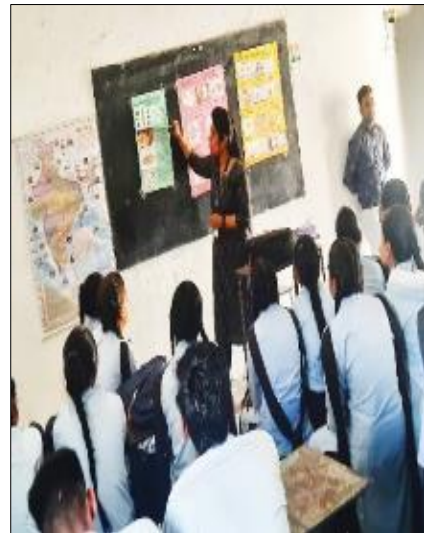


Fig 6: Providing nutrition education through charts and posters



Fig 7: Respondents gaining education through videos

Assessment of nutrition education and dietary counselling

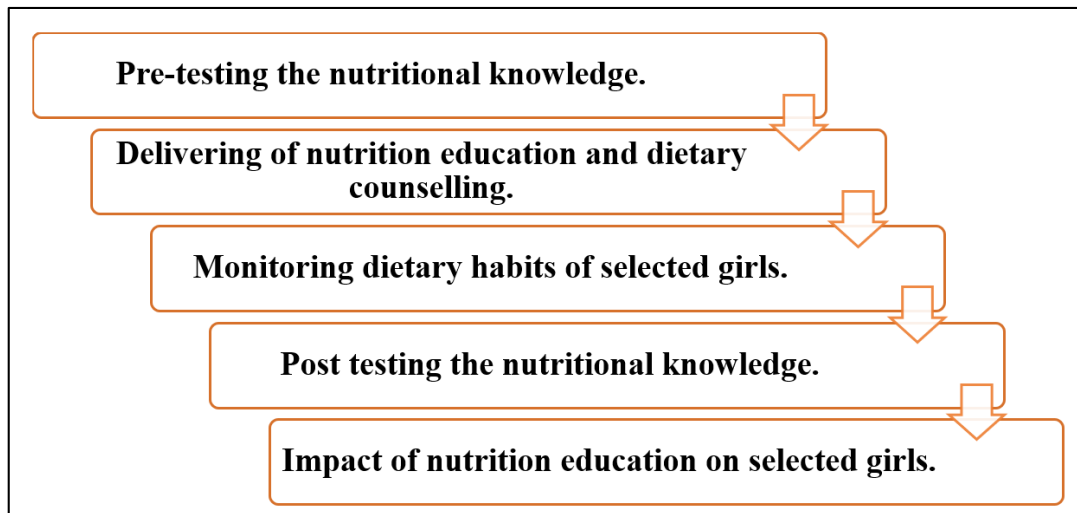


Fig 8: Diagrammatic representation of educational knowledge test

Statistical analysis

After gathering all the data, every data was properly evaluated with the support of the proper statistical processes to get to a valid result.

Percentage

In order to assess the data for general information and food patterns, percentage and frequency were employed.

Mean and standard deviation

Anthropometric measurement (height and weight), pre- and post-response results were derived as mean±standard deviations with Microsoft excel (version 2013) by coding all the data values.

Results and Discussion

1. Background information of the adolescent girls of different ages

- **Age:** Specific age group were selected for survey. 16 students were selected from each class from 8 to 12 standard that is of the age group 14, 15, 16, 17, 18.
- **Religion:** Results from graph no. 9 showed that the majority of respondents were Hindu i.e. 76 out of 80 students making 95 percent of the total students and the rest 4 respondents were Muslim.

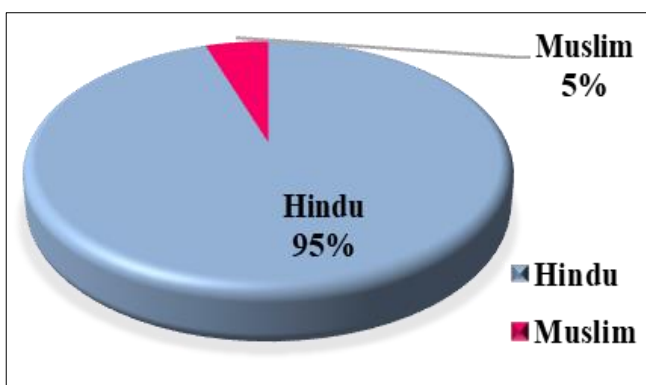


Fig 9: Percentage distributions of religions

Types of family: Results from graph no. 10 showed that out of 80 respondents 67 respondents belongs to joint family

(83.75%), (11.25%) were from nuclear family and only 5% were from extended family.

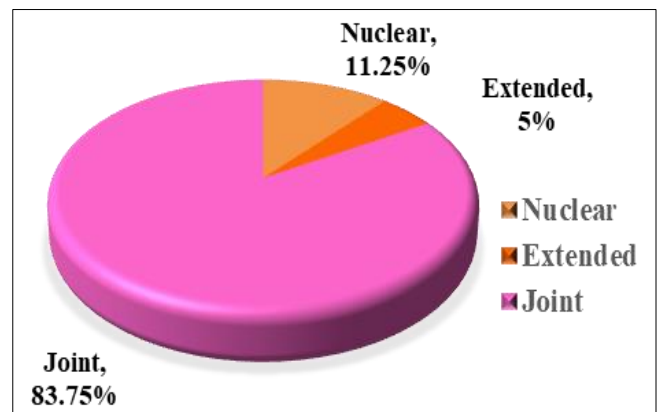


Fig 10: Percentage distributions of types of family

Occupation of father: Majority of the family were working as labour that is (36.25%) and most of the family responded as others that is (30%) where 15 students responded as their father were in some kind of service (18.75%) and rest other were working as agriculture as well as business that is (11.25%) and (3.75%) respectively.

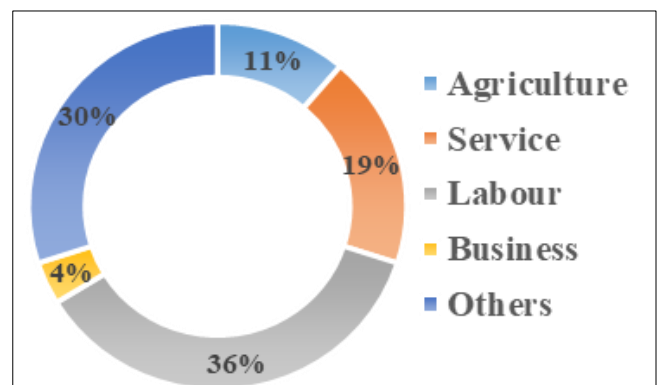


Fig 11: Percentage distribution of occupation of father

Occupation of mother: Results from graph 12 observed that maximum number of mother were housewives (77.5%) and

most of the respondents were respond as others (11.25%) and 5 responds as their mothers working as agriculture that is (6.25%) and rest as service and labour that is (3.75%), (1.25%).

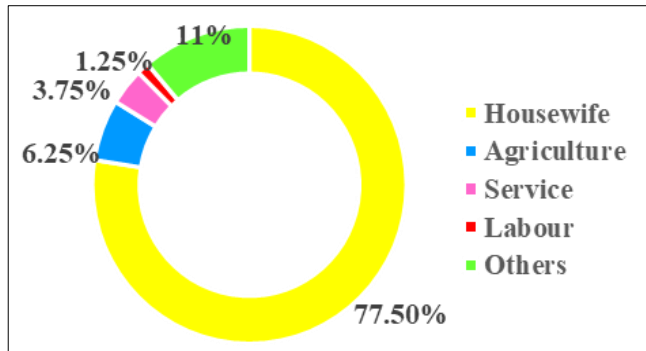


Fig 12: Percentage distribution of occupation of mother

Family Income: According to graph 13 results, 91.25% of the families made less than Rs 30,000, while only 8.75% of families made equal to or more than Rs 30,000. The majority of the family were not as well of

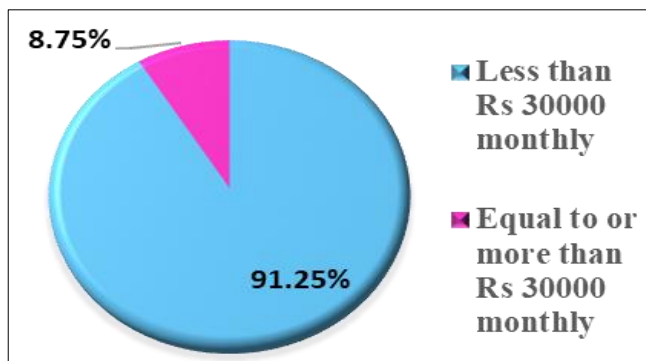


Fig 13: Percentage distribution of family income

Father's education level: According to graph 14 results observed that majority of father's have basic knowledge that is (30%), secondly most of them are illiterate that is (27.5%), and thirdly most of them had secondary knowledge that is (20%) only (1.25%) had informal education and rest only (10%) father's had university level education other (11.25%) respondents were not aware about their father's education level.

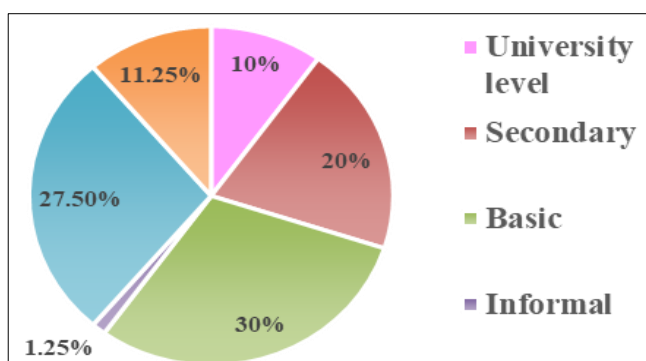


Fig 14: Percentage distribution of father's education level

Mother's education level: Results observed from graph 15 that majority of respondent's mothers were illiterate (33.75%), secondly (21.25%) respondent's mothers had

secondary knowledge. Basic knowledge had (17.5%). Only one respondent's mother had university level education that is (1.25%) and rest (6.25%) had informal education level other (20%) were not aware.

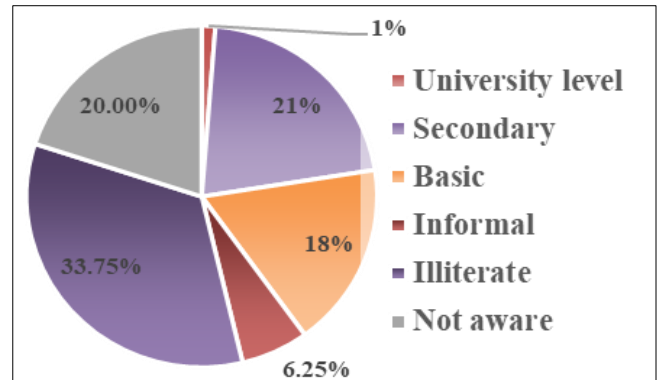


Fig 15: Percentage distribution of mother's education level

Sources of drinking water: According to graph 16 results observed that majority of respondents had facility of drinking water from drinking water tap that is (81.25%), secondly most of them had facility from well that is (10%) and rest only (8.75%) had facility from tube well.

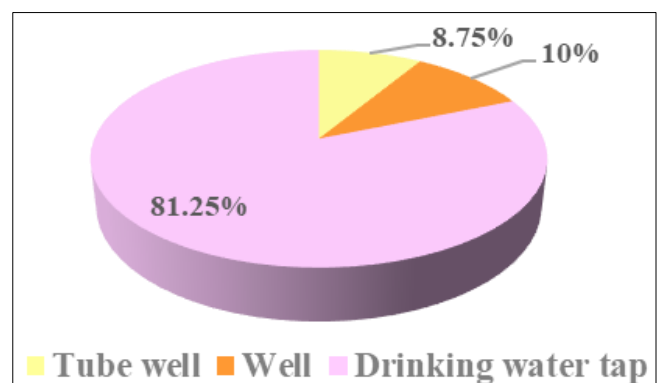


Fig 16: Percentage distribution of main source of drinking water

Water purification: Results from graph 17 observed that majority of respondents had purified water facility in their home that is (78.75%) and (21.25%) respondent's family do not had purified water facility.

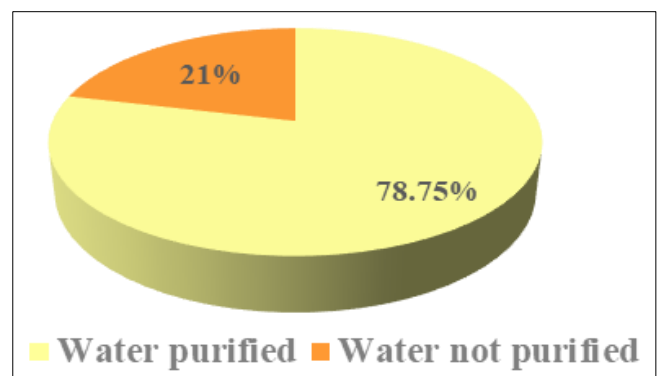


Fig 17: Percentage distribution of purification of water

Toilet facility: According to graph 18 it was observed that now a day's most of the respondent's families had toilet facility that is (87.5%) and rest respondent's families still don't have toilet facility that is (12.5%).

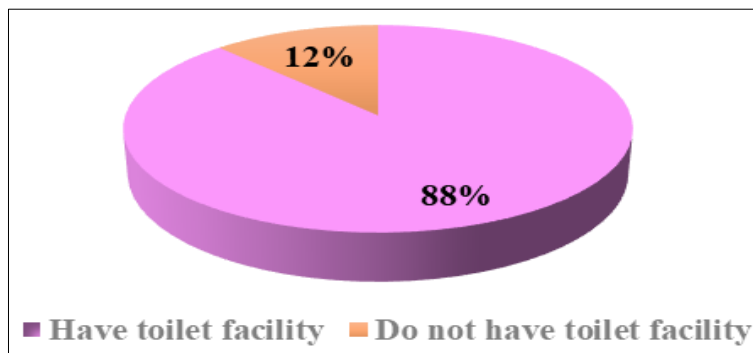


Fig 18: Percentage distribution of toilet facility

Main sources of food: From graph 19 results observed that Rajakiya Uccha Madhyamik Vidyalaya from class 8 to 12 that majority of respondent's have their sources of food from market purchasing that is (72.5%) and (18.75%) respondent's

families had source from both market and own production and only (7.5%) respondents have their own production and (1.25%) from others.

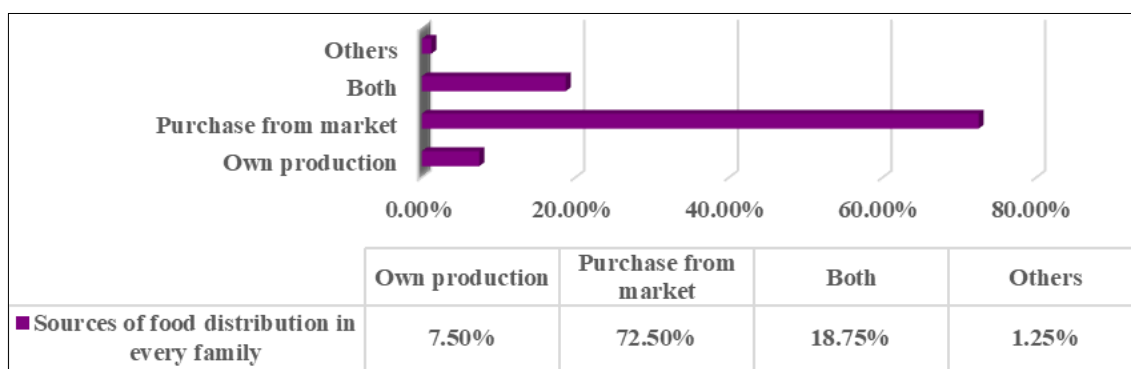


Fig 19: Percentage distribution of sources of food in every family

Nutritional status of the respondents

Anthropometric measurement has been done by taking height and weight of all respondents and then mean and standard deviation has been calculated.

Table 1: Height and weight of the adolescent girls

Parameter	Respondents (80) Mean±SD
Height (cm)	157.7±0.159
Weight (kg)	51.6±11.34

In my investigation table 1 it was found that the average mean height and SD of respondents were 157.7±0.159 and average mean weight and SD of respondents were 51.6±11.34.

BMI: The BMI is a helpful indicator of obesity and overweight. Based on your weight and height, it is determined.

Table 2: BMI classification of the participants

Classification of BMI	Number of Participants (Total – 80)
Underweight (<18.5)	26 (32.3%)
Normal (18.5- 24.9)	31 (38.75%)
Overweight pre obese (25.0 – 29.9)	17 (21.25%)
Obese (> 30)	6 (7.5%)
Class I (30.0 – 34.9)	0
Class II (35.0 – 39.9)	0

Analysis from table 2 reveals that, In Achrol, Rajakiya Uccha Madhyamik Vidyalaya from classes 8 to 12 that is age group from 14 – 18 years of adolescent girls out of 80 respondents

majority of respondents were underweight 26 (32.3%), overweight 17 (21.25%) and obese 6 (7.5%), remaining (38.75%) respondents were in normal range.

Dietary intake and food habits of 3 days 24 hour dietary recall

Before three days, the frequency of food consumption was examined. In below table 3 it has shown that the mean and SD of total serving size of all food groups that is cereals and pulses, fruits and vegetables, milk and milk products, fats and oils, meat and poultry in each 3 days are given.

Table 3: Average dietary assessment of 3 days 24 hour dietary recall of all respondents according to food groups

Food groups	Day 1	Day 2	Day 3	Average Mean±SD of 3 days
Cereals and pulses	3.63	3.43	3.47	3.51±0.10
Fruits and Vegetables	1.16	0.92	1.06	1.05±0.11
Milk and milk products	0.62	0.66	0.63	0.64±0.01
Fats and oils	1.38	1.25	1.27	1.30±0.07
Meat and poultry	0.03	0.05	0.06	0.05±0.01

Results from table 3, the average mean and standard deviation of a three-day diet consisting of cereals and pulses were found to be 3.51±0.10, fruits and vegetables were 1.05±0.11, milk and milk products were 0.64±0.01, fats and oils were 1.30±0.07, meat and poultry were 0.05±0.01.

Physical activities of adolescent girls.

The physical activities portion covers the respondents sleeping hours, transport usually used by them from school to

home or vice versa, Spending of time doing homework, activities done at school breaks and domestic activities.

Sleeping hours in a day: Results from figure 20 showed that majority of respondents slept 7 hours in a day that is (23.75%). Mostly responded as they slept 8 or more hours that is (23.75%) and (22.5%) slept 6 hours and rest (8.75%) slept 5 or less hours.

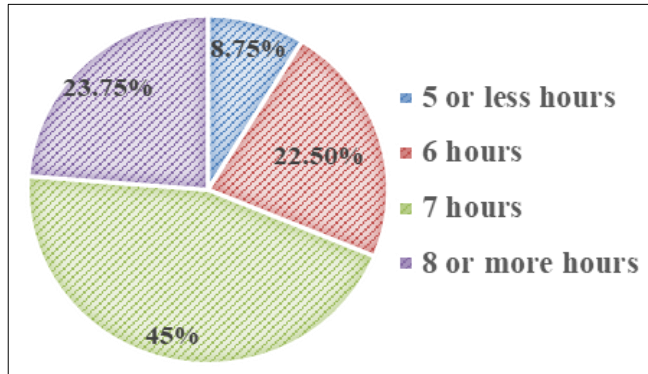


Fig 20: Percentage distribution of different hour's adolescent sleep in a day

Form of transport: Results from figure 21 observed that majority of respondents generally walking when travelling that is (72.5%), almost (15%) of respondents were used public transport and (7.5%), (5%) respondents were used cycle and private vehicle respectively.

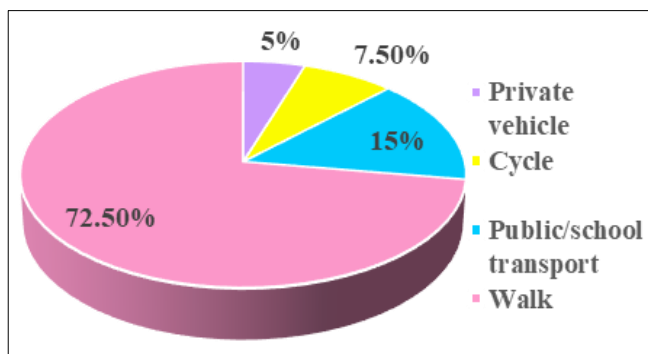


Fig 21: Percentage distribution of journey normally used for travelling

Spending on doing homework: Results from figure 22 observed that majority of respondents (60%) done their homework for 1 to 2 hours a day. More than 2 hours a day (31.25%) are done their homework and (5%) spends their time for less than an hour a day. (3.75%) respondents spends 0 hours.

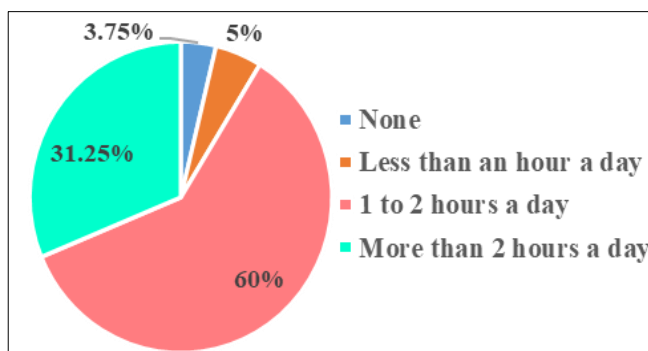


Fig 22: Percentage distribution of spending on doing homework

Work done during school breaks: Results from figure 23 analyzed that majority of respondents spending their time standing or walking around that is (53.75%). Secondly, (43.75%) were spending their time sitting down like talking, eating and reading. Lastly, (2.5%) spending their time running or playing game only.

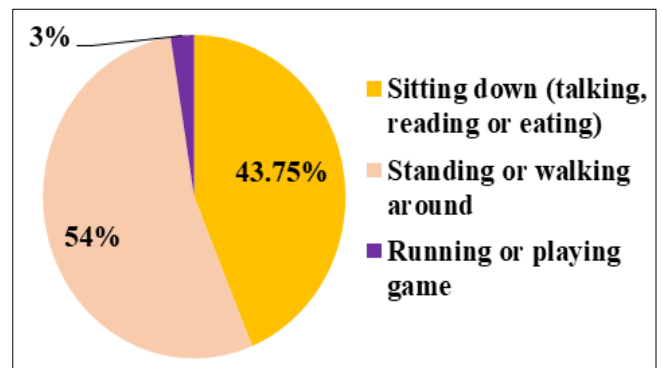


Fig 23: Percentage distribution of usually work at school breaks

Perform physical activities: Results from figure 24 showed that majority of respondents were not perform physical activities outside the school that was (75%) and only (25%) of respondents were performing physical activities.

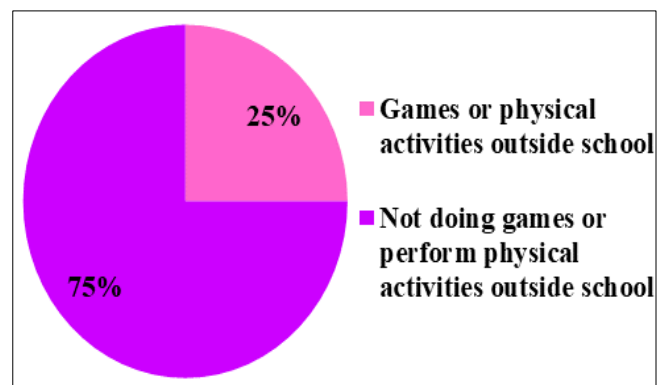


Fig 24: Percentage distribution of play games or perform physical activities

- **Domestic activity:** Results from figure 25 observed that (100%) of respondents were performing domestic activity in their own family.
- If yes, how much time in a day do you involve in domestic activities?
 1 hour – 32.5%, 2 hours – 36.25%, 3 hours – 20%, 4 hours – 7.5%, 5 hours – 2.5%, 6 hours – 1.25%

Results showed that majority of respondents spending their time 2 hours for doing domestic activity that was (36.25%) and then 1 hour spending (32.5%). Almost (20%) of respondents spending 3 hours for doing domestic work and rest (7.5%), (2.5%), (1.25%) spending their time doing domestic activities that is 4, 5, 6 hours respectively.

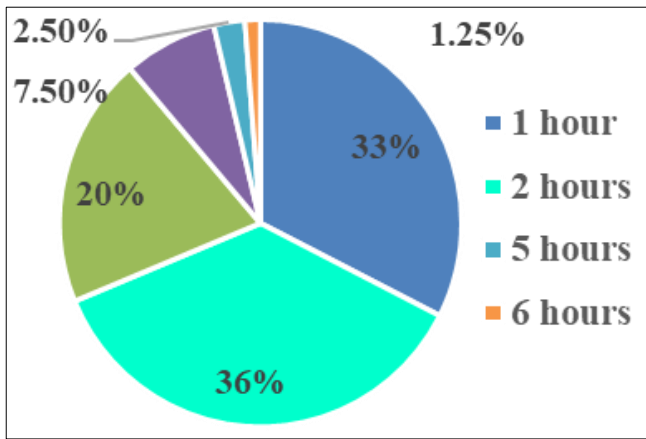


Fig 25: Percentage distribution of students involve in domestic work

Dietary intake and food habits

Skipped meal: Results from figure 26 analysed that out of 80 respondents majority of respondents had skipped their meal was (75%) and rest (25%) did not skipped their meal.

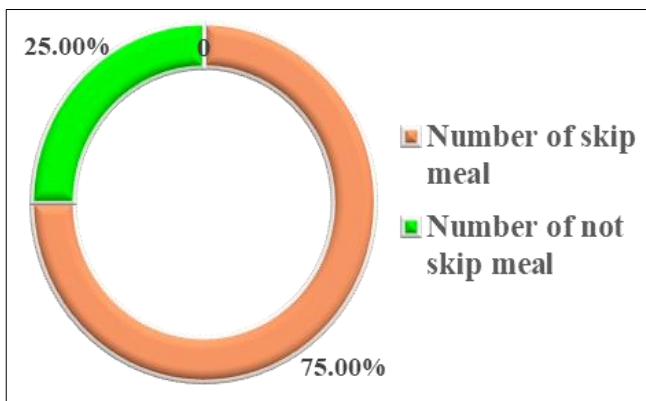


Fig 26: Percentage distributions of skipping meal

Kind of meal skipped: Results from figure 27 analyzed that out of 80 respondents majority of 41 that is (51.25%) respondents skipped their lunch and (30%) of respondents skipped their breakfast and rest (2.5%) skipped their dinner. Some respondents did not respond anything that is around (16.25%). 13 students not respondent – 16.25%.

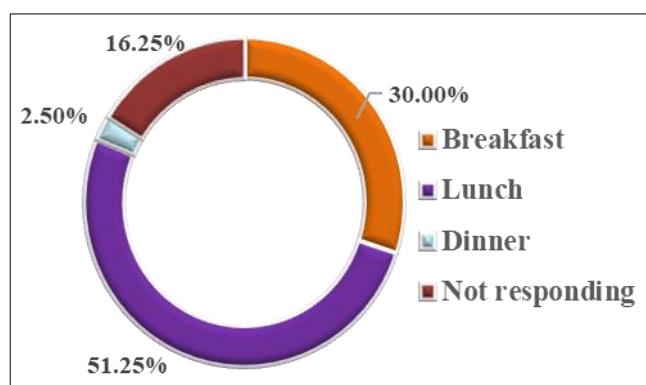


Fig 27: Percentage distributions of types of skipping meal

Number of times meal skipped: Results from figure 28 analyzed that out of 80 respondents majority of 41 respondents that is (51.25%) skipped their meal three – four times a week and (30%) of respondents skipped their meal once – twice a week and rest (2.5%) skipped their meal five

or more days. (16.25%) students not responded. 13 students not respondent – 16.25%

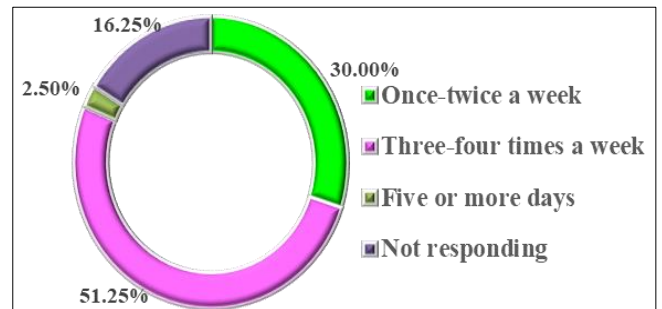


Fig 28: Percentage distributions of number of times meal skip

Responded eating place: From figure 29 results analyzed that majority of respondent ate in front of TV (65%). In dining room or kitchen (17.5%). In bedroom and other places (8.75%) each.

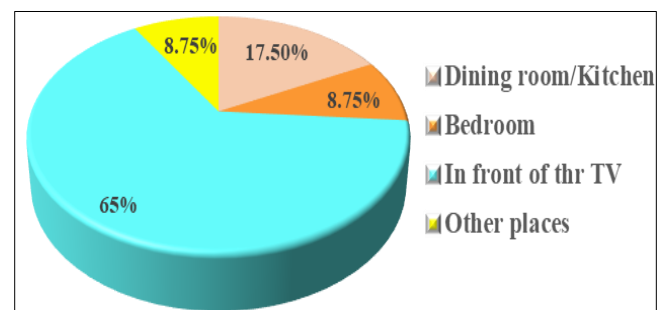


Fig 29: Percentage distributions of adolescent eat usually in home

Categories of meal: Results from figure 30 analyzed that majority of respondents were lacto – vegetarian that is (41.25%) and (28.75%) respondents were vegetarian, (11.25%) were ova – vegetarian, (6.25%) were lacto – ova – vegetarian and rest (12.5%) are non – vegetarian.

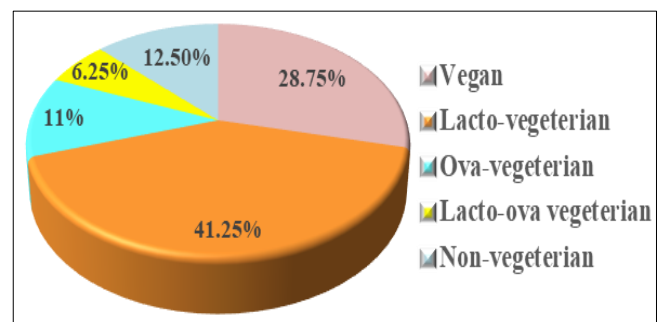


Fig 30: Percentage distribution of categories of meal

Glasses of water: We should drink more and more water for hydrating our body. Results from table showed that majority of respondents were drink 5 to 7 glasses of water that is (53.75%), 2 to 4 glasses were drink (28.75%) and rest 1 and more than 8 glasses of water were drink by (2.5%) and (15%) respectively.

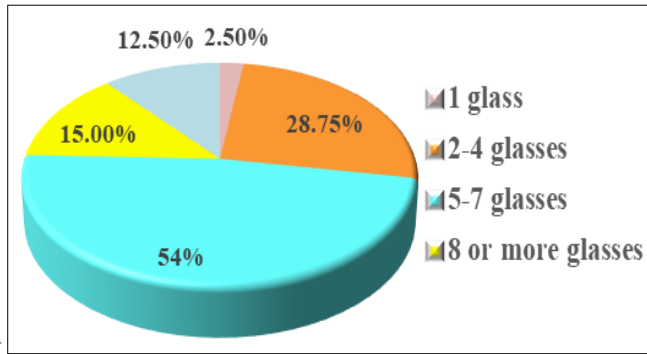


Fig 31: Percentage distribution number of glasses water in a day

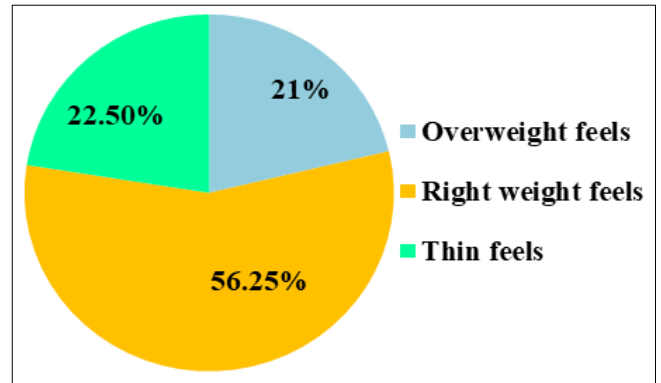


Fig 34: Percentage distribution of feel about their figure

Daily pocket money: Results from figure 32 showed that majority of respondents that is (56.25%) respondents were not given any types of pocket money and (28.75%) respondents were sometimes given and rest (15%) are not given.

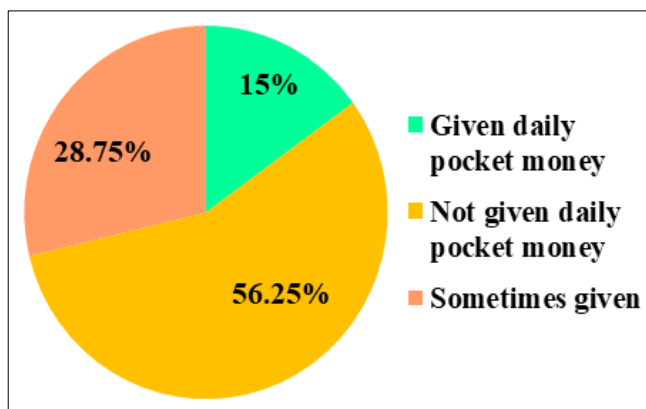


Fig 32: Percentage distribution of daily pocket money

Tried losing weight: Results from figure 35 showed that majority of respondents were not tried for losing their weight that is (87.5%) and rest (12.5%) were tried losing weight.

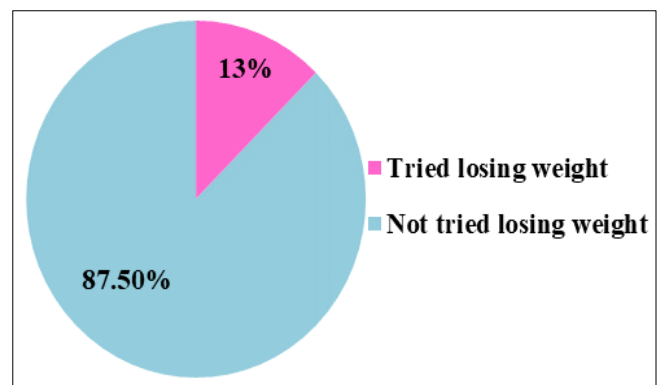


Fig 35: Percentage distribution of their losing weight

Buying food -Results from figure 33 showed that majority of (66.25%) were not buying any type fast food from vendors and rest (33.75%) respondents were buying food from vendors or shops.

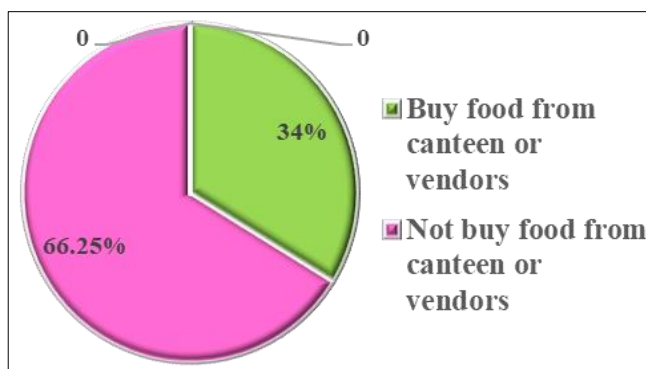


Fig 33: Percentage distribution of buying food from canteen or vendors

Tried gaining weight: Results from figure 36 showed that majority of respondents were not tried for gaining their weight that is (87.5%) and rest (12.5%) were tried gaining weight.

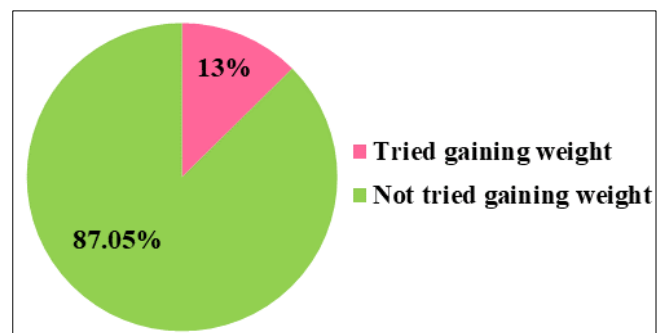


Fig 36: Percentage distribution of their gaining weight.

Feeling about figure: Results from table figure 34 showed that majority of respondents felt that their figure were right that is (56.25%) and (22.5%) felt thin, rest (21.25%) felt overweight about their figure.

- **Smoking:** After survey in Achrol Higher Secondary School it was found that (100%) of respondents were not consuming smoking.
- **Alcoholic beverages:** After survey in Achrol Higher Secondary School in it was found that (100%) of respondents were not consuming alcoholic beverages.
- **Special diet for medical reasons:** After survey in Achrol Higher Secondary School it was found that majority of (83.75%) respondents were on medical diet and rest (16.25%) were not on medical speciality diet.



Fig 37: Percentage distribution of special diet on medical reason

- **Vegetarian:** Results from figure 38 showed that majority of respondents that is (71.25%) respondents were vegetarian and rest (28.75%) respondents were not vegetarian.

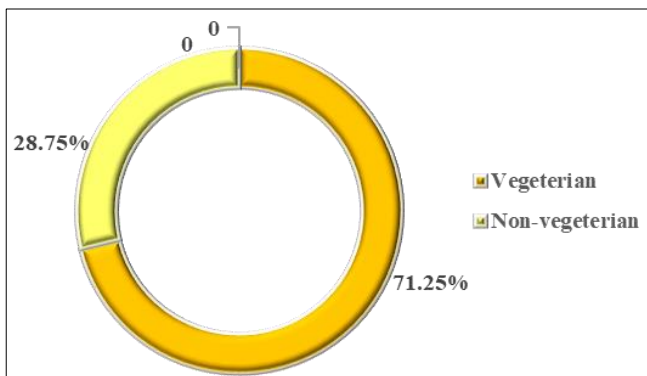


Fig 38: Percentage distribution of special diet on medical reason

- **Problems related to appetite:** After survey in Achrol Higher Secondary School in figure 39 it was found that majority of respondents that is (63.75%) respondents do not have problem related to appetite and rest (36.25%) respondents had problems related to appetite.

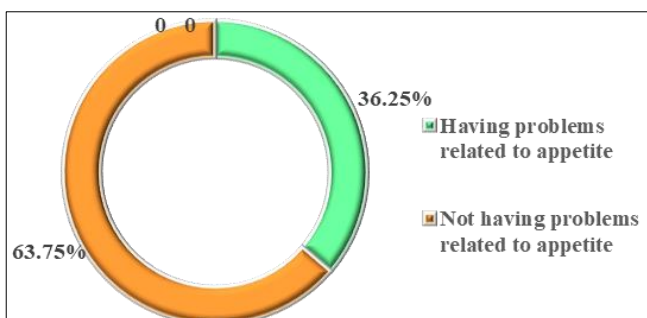


Fig 39: Percentage distribution of adolescents having problem related to appetite

Imparting nutrition education and monitoring the impact of nutrition education of all respondents.

With the aid of several educational techniques like leaflets, posters, and films, a nutrition education package was given. Following the nutrition lecture, it was found that the majority of the respondents had gained the necessary nutritional knowledge. The majority of respondents were unaware of nutritional facts prior to receiving nutrition education and dietary guidance. Education about nutrition has had a positive effect. In the table 4 below, the evaluation of each pre- and

post-response is presented.

Table 5: Overall assessment of pre and post correct responses.

Knowledge screening	Total correct responses	Overall percentage (%)
Pre - responses	2648	82.75%
Post - responses	2987	93.34%

Conclusion

Adolescence is a vital period in a woman's life and is seen as the foundation of a happy, forward-thinking family. They represent the community's future for fostering excellent health. For their optimal physical, mental, cognitive, and total growth and development during this time, good diet is crucial. Adolescent nutrition has an impact on both the overall population growth and the growth of the nation(Twara el al., 2015).In order to engage in effective physical exercise and have a healthy pregnancy, adolescent girls' nutritional status is important.

The study was carried out with the objectives to assess the nutritional status of the adolescent girls. To find out eating behaviours, dietary patterns and physical activities among each adolescent girls. Lastly, imparting nutritional based education and dietary counselling by assessing the nutritional status.

On the whole there are 22 blocks in Jaipur district. Achrol, Rajakiya Ucha Madyamik Vidyalaya was chosen for the study. The study was carried out on 80 adolescent girls belonging to 10 – 19 years age group.

A well-structured interview schedule was introduced to order to extract relevant information from the selected respondents. The information related to dietary intake, food habit and knowledge about the food was assessed through interview and food consumption of the subjects was assessed using a 3 days 24 hour dietary recall method. To assess the impact of nutrition knowledge of adolescent girls, pre and post-test were conducted. Data were examined as per the objectives of the study. The qualitative and significant data were coded, tabulated and compiled to draw meaningful inferences.

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