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Original Research Article

Dietary impact of binge eating on children

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Abstract

A study was conducted about Binge eating behaviour in children. For this, 50 school going children were selected, out of whom 38% were boys and 62% were girls. Children were ranged in the age group of 10 to 15 years. It was a cross sectional study which was done by online mode. Purposive sampling method was used for sample selection. For data collection, an online questionnaire was formed which was sent to the parents of selected kids and the data received was analyzed statistically.

Subjects were given a diet plan, which affected their weight. Sixty four percent of children followed the diet plan. When reasons were analyzed for the overeating behaviour, it was found that 62% of subjects were afraid of loss of control on eating, 80% of subjects were unhappy about their size and weight. Thirty eight percent of people used to overeat when they feel lonely. There were 30% of people who did not want to eat food while 32% of children showed their willingness towards eating food.

Keywords

Binge eating, weight gain, appetite, obesity, over eating

Introduction

Eating Disorders

There are a number of eating disorders that affect a person both physically as well as mentally. These are -

- Binge eating disorder in which patient eats unusually high amounts of food without their control on their eating behaviour
- Anorexia nervosa: In this disease, the person is very cautious of weight gain and take extreme actions for weight loss by strict diet restrictions and over exercising
- Bulimia nervosa: In Bulimia nervosa, the patient eats unusually large amounts of food followed by purging due to feeling of guilt;
- Pica: Habit of eating non-food items;

- Rumination syndrome: It is known as regurgitation of undigested or minimally digested food [13];
- Avoidant/restrictive food intake disorder (ARFID): It's a disorder characterized as reduced food intake due to one's own psychology [1] [12].

Binge eating disorder (BED) - an introduction

In single sitting, consumption of large amounts of food is termed s Binge eating. This behaviour can be diagnosed as Binge eating only if it is expressed at least once a week over 3 months. This large amount of food consumption is usually associated with feelings of shame or sadness. The affected person usually hides it, therefore their family and close friends may not be aware of the problem. It's a serious mental health issue as the person doesn't have control over one's eating behaviour even after they know that their approach is not healthy. They used to overeat even if they were not hungry. Anybody can be affected by this irrespective of age, gender, ethnicity or background [2] [3].

Prevalence & magnitude

Different emotions are responsible for binge eating such as feeling low, bored, lonely, angry, upset or anxious. Extremely happy or excited situations also lead to Binge Eating [4].
BED is the most common eating disorder in the United States. It has been found that about 1.25% of females and 0.42% of males are affected by BED. Occurrence is seen ten times more in females than in males [5]. Prevalence of BED in adolescents has been found in nearly 1.6% teenagers. The symptoms of BED generally appear at the age of 25 years.

Symptoms

The affected person may cut down the amount of food after an episode of Binge eating due to feeling guilty of overeating. This behaviour can create an unbreakable vicious cycle with drastic fall or rise in blood sugar levels [6]. People with anorexia nervosa (AN) and Bulimia have shown signs of uncontrolled eating as they try to control their diet for proper shape but after that they face craving and therefore overeating is a common sign in both of these eating disorders. According to the DSM-5 criteria [7], BED is associated with three or more of the following symptoms:

- Abnormally gulping of food
- eating until uncomfortably full
- eating unusually large amounts of food even if not hungry
- eating alone
- Having negative feelings of disgust, sad or guilty
- BED episode is repeated at least once a week for three months
- It is not followed with unusual compensatory behaviours [10]

Risk factors & etiology

BED is common among people with type 1 and type 2 diabetes. It may be associated with the continuous focus on weight and diet control as the main treatment line in diabetes. BED can be a risk factor in development of diabetes due to polyphagia. Management of blood sugar becomes harder in a binge eater as he has no control over eating behaviour.

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Etiological factors behind BED may be both biological and environmental. In many cultures, thinness is considered a symbol of beauty. These people receive more opportunities while obese people are seen with a feeling of disgust and shame [8]. Intellectual disabilities also play a causative factor in BED.

Family problems or critical comments on one's shape or weight may also be a causative factor in development of BED. Genetics also plays a role in BED. Overeating is very common in human beings be it in social gatherings or one is eating alone.

Figure 1: Binge Eating Cycle

Consequences

Binge eating is associated with high grade depression that may affect overall quality of life and productivity of a person. Overconsumption of food in BED can further aggravate the situation by obesity related health problems like type 2 diabetes, heart disease, osteoporosis, sleep apnea and cancers. Mental health issues including depression, anxiety or suicidal thoughts are also common in BED [8]. Sleep disorders, digestion issues, bodyache and joint pain are also some other common signs that may interfere in activities of daily routine. It may be seen in children also [11] that may be missed while diagnosing the problem due to some reasons below -

- Child may not show weight loss rather he will not gain weight as per his height and age [9]
- He may refuse to eat certain foods without any specific explanation
- Hyperactivity (a sign of BED) can be misinterpreted in children
- They may show increased interest in cooking also

Treatment

Effective counseling for behavioural changes, dietary modification, and exercises play a very important role in treatment. In extreme cases, hospitalization may be required. Treatment for BED is based on the solution of the underlying cause responsible for binge eating. It may be stress, poor coping skills, low self esteem etc. It's the team work of a registered dietitian, behaviour health therapist, medical doctor and psychiatrist. A registered dietitian needs to interview the patient without any judgment and analyze his intake, nutrient consumption, meal and snacking time, food behaviours and weight cycles very carefully. In these cases, a patient needs to be educated to identify the difference between hunger and

craving. He should set meal timing and meal portions. Restrict restriction of any food should not be done to avoid craving. Increasing public awareness is another step towards prevention of BED.

As it's related to mental health, therefore it is not shared easily, but a registered dietitian should counsel a patient positively.

Objectives

- To examine the prevalence of binge eating disorder symptomatically
- To assess the daily activity of the subjects
- To create awareness about binge eating disorder

Research Methodology

Locale of the study: Samples for the study were selected from various places like Bhilwara, Ujjain, Indore, Jaipur, Shajapur, Udaipur, Chittor, Varodara etc.

Study Design

In the present study, cross-sectional data was collected online from various places

Sampling

Sample selection

The sample selection of the study was done by PURPOSIVE SAMPLING. The sample selection was done through online mode. Samples were informed of the study and asked verbally for their consent to participate.

Inclusion Criteria

School going children (girls & boys both are selected) Age between 10 to 15 years of age.

Sample Characteristics

50 subjects were selected for the study (N= 50) The age range of the subjects was 10 to 15 years. Both males and females were selected as subjects of the study.

Questionnaires

The data collection was done by using pretested structured questionnaires which were made by Google from. Two types of questions were included in the questionnaires were used in the study.

1. The first questionnaire was based on age, weight, height, gender etc.
2. The Second questionnaire is based on eating habits, physical activity, how many times do you eat food in a day, your body size and shape etc.

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Format of the Questionnaire

1. Name ……
2. Age ……
3. Email address ……
4. Gender ……
5. Height ……
6. Weight ……
7. Income group ……
8. Have you tried to follow definite rules regarding your eating in order to influence your shape or weight? ……
9. Do you have the urge to stay on an empty stomach to reduce your size or weight?
10. Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example working, following a conversation or reading)?
11. Have you had a definite fear of losing control over eating?
12. Are you dissatisfied with you size or weight?
13. What activities do you do while eating?
14. Do you sometimes have a strong hungry to food?
15. Do you want to eat too much food when you are alone even through you have eaten recently? ……
16. Do you sometimes do this because you are sad, angry and feel alone?
17. How dissatisfied have you been with your weight (last 28 days)?
18. How dissatisfied have you been with your shape (last 28 days)?
19. Did you skip meal in a day?
20. Which meal you skip?
21. Do you worry you have lost control over how much you eat?
22. Do you eat meals at different times throughout the day without any planned meals?
23. Do you feel frustrated because you have little or no control over your eating habits?

The links for the questionnaire were sent to the sample and the responses of the questionnaires were completed accordingly.

Anthropometric measurement

Anthropometric measurements are tools to assess the composition of the body. These include different aspects like height, weight, body mass index (BMI), body circumferences (waist, hip, and limbs and skinfold thickness), fat percentage, fat free mass, bone mineral density etc. These can be used to assess baseline status as well as progress status. These measurements give an idea of a person's body size and shape.

BMI classification as per WHO guidelines:

Weight status	BMI (kg/m2)
Underweight	<18.5
Normal range	18.5 - 24.9
Overweight	25 - 29.9
Obses	>30
Obese class I	30 - 34.9
Obese class II	35 - 39.9
Obese class III	>40

Table 1: WHO classification for BMI

Statistical Analysis

Frequency, mean and standard deviation were used to analyze the obtained data.

The data received from the questionnaire of the survey was entered on the excel sheet and then the mean and standard deviation were calculated.

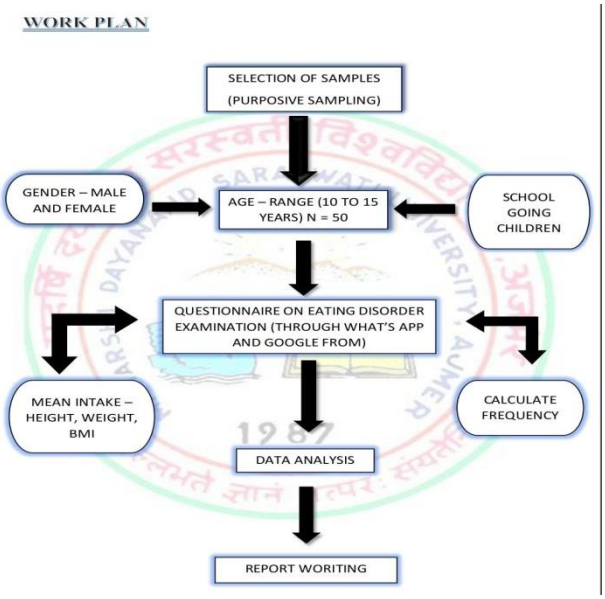

Figure 2: Work plan

Patients were provided diet counseling online as per following format -

Format for diet counseling

FATS AND OILS Avoid – Ghee, butter, cream, processed cheese, parantha, fried items (like purl, pakora, etc.) Prefer - Use a combination of oils MUFA rich oils: Olive oil, rice bran oil, flaxseed oil, etc. PUFA rich oils: Soybean oil, groundnut oil, mustard oil, sunflow-

er oil, etc. Quantity – 2-3 tsp. (10-15ml) in a day

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SUGAR AND SWEETS Avoid - Cake, pastry, ice cream, fried sweets (like jalebi, imarti, gulab jamun, etc.) Prefer - Use sugar-free substitutes like stevia, Monk fruit, etc. in beverages and food Items. Use jaggery, honey etc. in place of sugar. Prefer avoiding sugar in tea/coffee/milk. Quantity – 1-2 tsp. of sugar or 10 grams of its substitutes in a day.

……

MILK AND MILK PRODUCTS Avoid – Full cream milk, buffalo milk, khoya, etc. Prefer – Toned or double toned milk, low fat cottage cheese, curd, buttermilk, etc. Quantity – Use only 500ml toned/cow's milk and milk product in a day.

……

NON-VEG PRODUCTS Avoid – Red meat, pork, egg yolk, shrimps, prawns, buffalo beef etc. Prefer – Chicken, fish, egg white, etc. Do not eat non vegetarian food items daily. Quantity – 25-30gm (roasted/grilled/steamed)

……

CEREALS Avoid – Refined wheat flour (Maida) white rice, etc. Prefer – Brown rice, oats, cracked wheat (dailya), wheat flakes, missy roti, (wheat, barley and kala Chana/soyabeans 4:1:1), Quantity – 160-200 gm. in a day.

……P

PULSES Avoid – Whole pulses, sprouts, Bengal gram flour (besan), etc. especially if the blood's uric acid levels are high. Prefer – Whole pulses, sprouts, dal, roasted Chana, etc. Quantity – 50gm/ 2 bowl in a day.

……

FRUITS Avoid – Fruit juices Prefer – All seasonal foods. Take banana, mango, cheeku, grapes, litchi, etc. in moderation. Quantity – 100-200 gm in a day.

……

VEGETABLES Avoid – Ready-to-eat vegetables, frozen vegetables, etc. Prefer – All seasonal vegetables. Take potato, tori, (arbi), sweet potato yam (jamikand), etc. in moderation. Quantity – 300-350 gm. of seasonal vegetables and salad in a day.

……

NUTS AND SEEDS Avoid – Salt/sugar/chocolate coated nuts, etc. Prefer – Almonds, walnuts, seeds (flax, chia, sunflower, pumpkin, etc.). Take pistachios and peanuts in moderation. Quantity – As per dietician's advice 5 almonds, 2 walnuts, 1 tea spoon flax seeds

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SALT Avoid – Sprinkling of salt on cooked/ raw/ food, dry savoury snacks (namkeen), chips, pickle, papad, sauces, preserves etc. Prefer – Iodized salt, black salt, rock salt. Avoid using salt in salad and yogurt. Quantity - As per dietician's advice 5 gm. / day.

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WATER Avoid – Aerated dinks, cold-drinks, caffeinated drinks, etc. Prefer – Plain water, coconut water, lemon water, clear soup without cream, buttermilk, etc. Quantity – As per dietician's advice

Sample diet plan

Meal	**Menu Quantity**
Early morning (7:00 am)	
Tea/coffee	1 cup
Biscuit (Marie/Digestive)	(2 in numbers)
Breakfast (9:00 am)	Cereals (wheat
flakes/Oats/Dailya) or Veg sandwich/idli /poha/ upma/	1 big bowl 2 in numbers /1
chapatti	Bowl / 1 in number
Milk	1 cup
Sprouts or lentils/ paneer/ Egg-white	25gm / 1bowl / 2 in number
Mid-Morning (11:30 am)	
Fresh lime water/ buttermilk/ coconut water/soup	1 glass/200ml
Fruit (papaya/ apple/pear/guava)	150 gm.
Lunch (1:00pm)	
Salad	1 plate
Rice / Chapatti	25 gm. /3 in numbers
Dal/paneer/soybean/non-veg	1 bowl
Seasonal vegetable	1 bowl
Yogurt	25gm
Evening tea (4:00pm)	
Tea/coffee	1 cup
Biscuit/roasted Chana	2 in numbers / 1 bowl
Evening snack (6:00pm)	
Soup/fruits/low-fat snack	200ml/150 gm./ 100 gm.
Dinner (8:00pm)	
Salad	
Rice Chapatti	1 plate 25 gm. 3 in numbers-
Dal/paneer/soybean/non-veg	1 bowl / 25 gm. / 2 in number
Seasonal vegetable	1 bowl
Dessert / yogurt.	50 gm./100gm
Bed time (9:30pm)	
Milk	1 glass/ 200ml

Results & Discussion

The study was conducted to assess the dietary impact of binge eating on children . The study showed the prevalence of binge eating among school going students. It will be easy to establish an association between binge eating and obesity, because binge eating is most harmful for human health.

Age and gender

Fifty samples were selected from the purposive sampling technique. Out of them 19 were boys and 31 were girls. All samples ranged in age from 10 to 15 years old. Sixty two % were girls and 38% were boys participated in our study.

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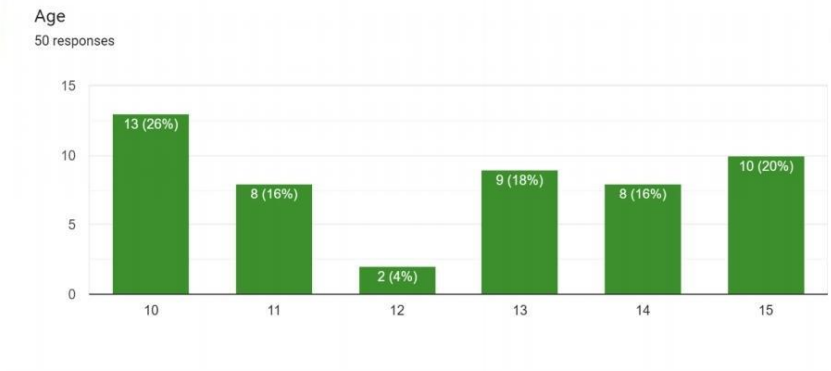

Figure 3: Age Group

S. No	Parameters	Options given	N (%) All subjects
1.	Age (years) Mean & S.D.		12.42 ± 1.89
2	Gender	Male	19
		Female	31

Table: 2 Background information of the subject (N= 50)

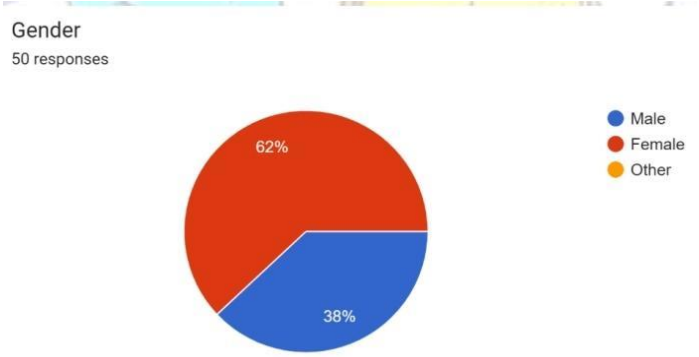

Figure 4: Gender

1. **Anthropometric measurements**: The height and weight measurements of all our subjects were collected and BMI was calculated. The mean weight of our subjects was 30.38 and the standard division was 4.94. The average height of our subjects was 3.37 and the standard division was 0.75.

S. No.	Measurements	All subjects (N = 50)
1	Weight (kg)	30.28 ± 4.94
2	Height (cm)	150 ± 0.75
3	BMI (kg/ m2)	13.5 ± 16

Table 3: Anthropometric measurements of children

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2. **Income Group**: Income group of all the girls and boys we took in our study, we got to know it through this chart. In our study 16% were girls and boys from low income group, 58% middle or 26% high income group.

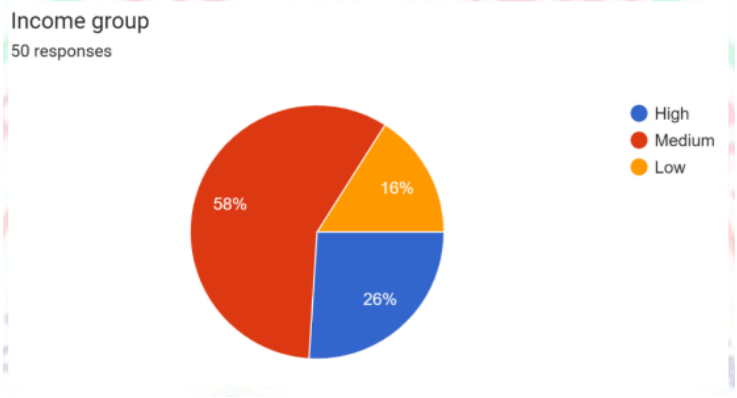

Figure 5: Income Group

3. **Shape & size**: In this study, there were about 64% subjects who followed the rules to maintain their body shape and size, while 36% were the subjects who did not follow the rules. It was found that there were 60% of subjects who were unable to pay attention to their interesting things due to size and shape, while 40% of subjects were such who pay attention to their interest like playing games, read books etc (Fig 6).

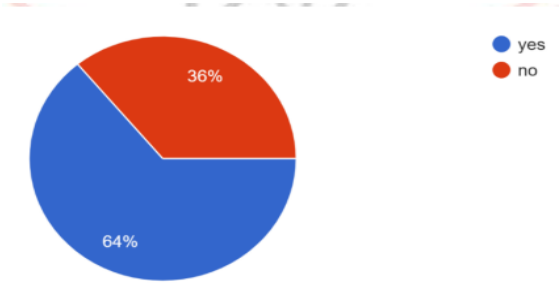

Figure 6: Shape & Size

4. **Weight/ shape influenced their eating pattern:** In our study, there are 54% of people who are hungry to reduce their weight and 46% of subjects who are not hungry.

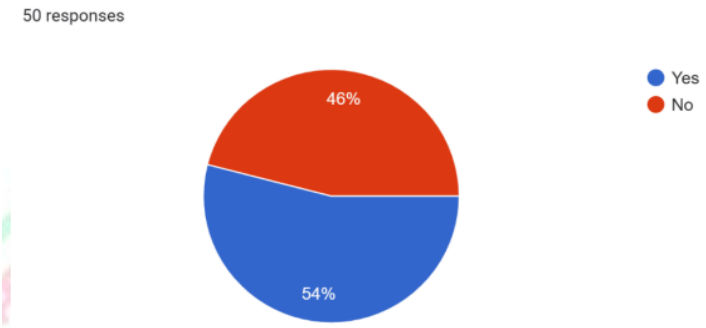

Figure 7: Weight/ shape influenced their eating pattern

5. **Fear of losing control over eating:** In present study, 62% of subjects are afraid that when they sit down to eat, they will eat more food than their limit and they will lose their control. Thirty eight percent subjects showed any kind of fear (Fig 8).

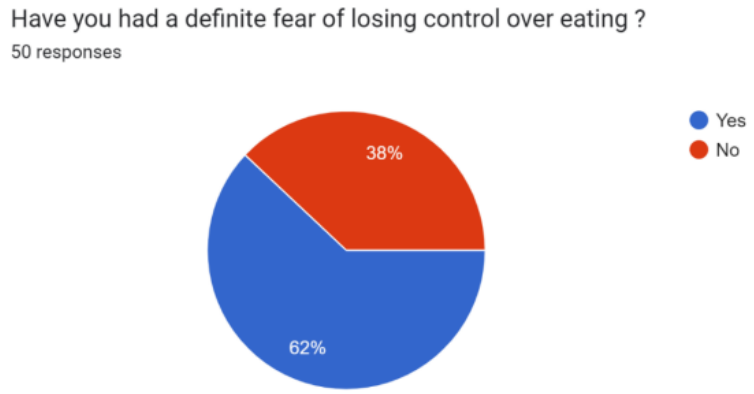

Figure 8: Fear of losing control over eating

6. **Dissatisfied with size or weight:** In the present study, 80% of subjects were unhappy about their size and weight, while 20% of subjects are happy with their size and weight.

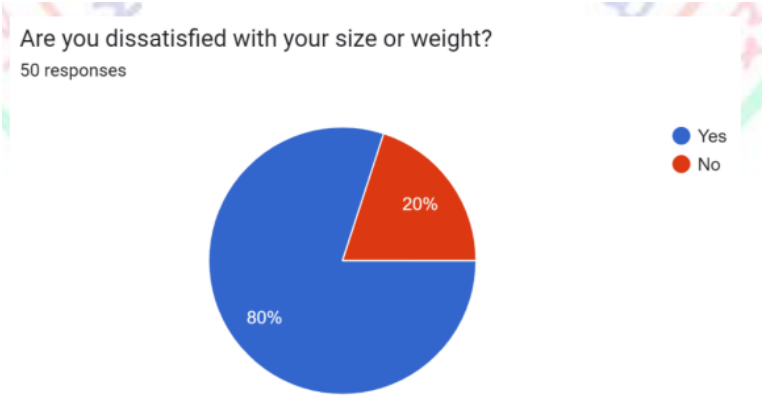

Figure 9: Dissatisfied with size or weight

7. **Usage of gadgets while eating**: It was found that 22% of the subjects eat while watching TV, 30% of the subjects eat while playing mobile, 42% of the subjects eat while watching a movie, while 14% of the people were such eating with other activities.

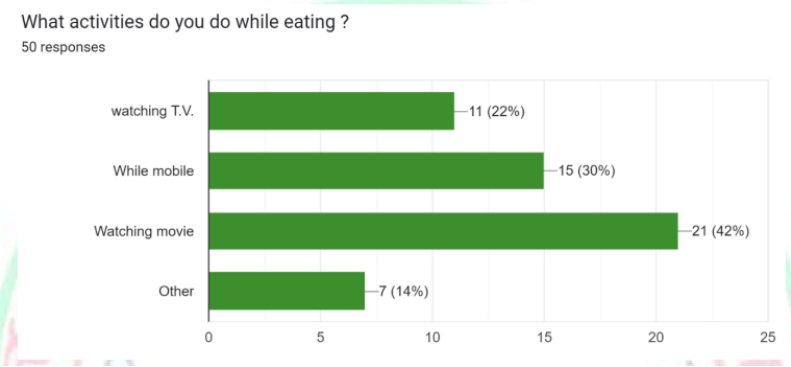

Figure 10: Usage of gadgets while eating

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8. **Feeling strong craving for food**: In recent study, there are 70% people who sometimes feel very hungry and want to eat more food and 30% are such people who do not feel hungry.

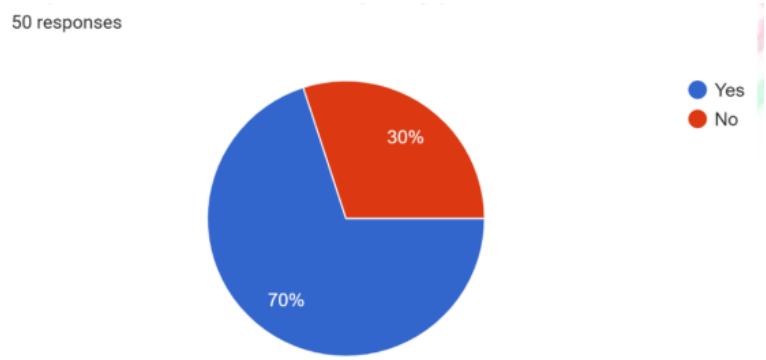

Figure 11: Feeling strong craving for food

9. **Tendency of eating alone**: Thirty eight % of people in the present study showed a tendency of eating when they were alone while they have just eaten. There were 30% of people who do not want to eat food and 32% of people were such that they probably want to eat food.

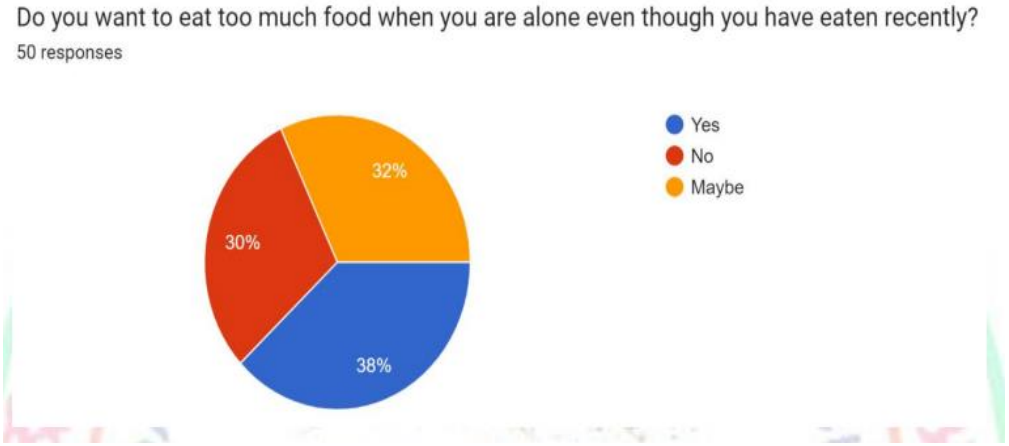

Figure 12: Tendency of eating alone

10. **Eating under mental stress**: Thirty percent of people did this because they were facing some or other mental stress like feeling lonely or angry or in tension as shown in figure 13.

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Figure 13: Eating under mental stress

11. **Dissatisfied with weight?** As figure 14 is showing, there were 12% of people who were completely satisfied with their weight. There were 36% of people who were slightly unhappy with their weight. There were 36% people who were moderately unhappy with their weight and 16% people were not happy with their weight at all.

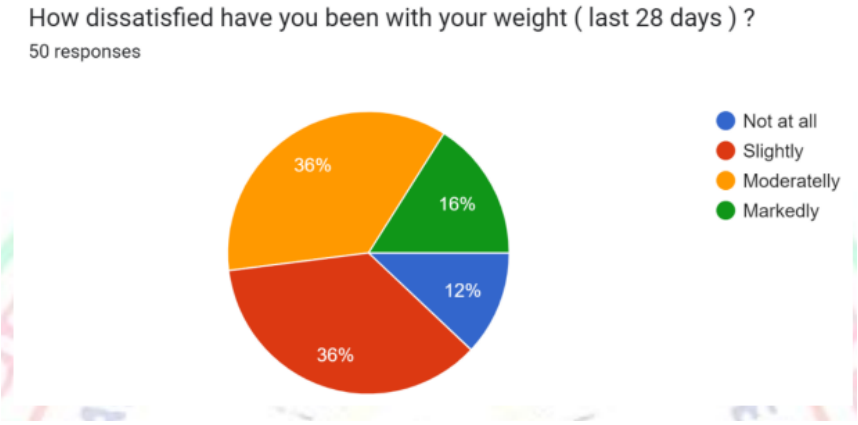

Figure 14: Grading of people with satisfaction towards weight status

12. **Shape:** There were 16% of the people in our study who are completely satisfied with their body shape, they don't need to change their body shape. There were 38% of people who believe that they need to change their body shape a bit. Twenty four percent of people were moderately unhappy with their body shape and thought it would be better to have a slightly different body shape. There are 22% people who are not happy with their body shape at all, they want to change their body shape (Fig 15).

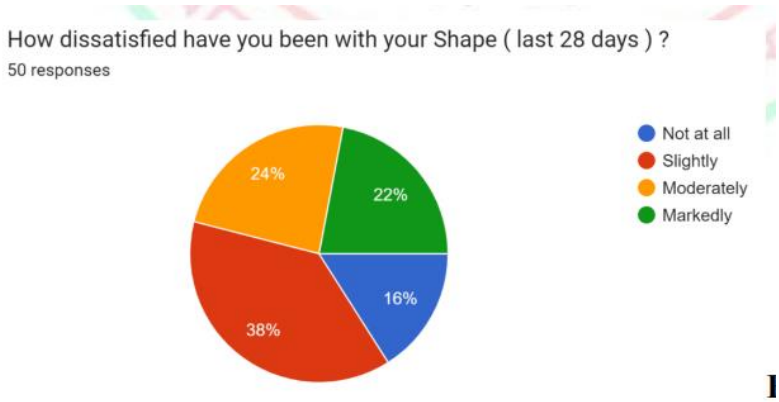

Figure 15: Perception towards body shape

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13. **Skip meals**: In our study, there are 42% of people who skip meals throughout their day. There are 4% people who do not skip their miles and 54% are such people who rarely skip their miles (Fig. 16).

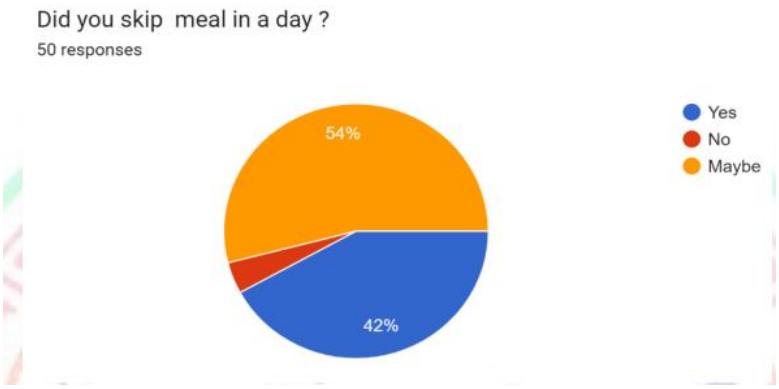

Figure 16: Tendency of skipping meals

14. **Which meal was skipped**? Results showed that 26% of people skipped breakfast, 28% skipped lunch, 28% skipped evening snack and 18% people skipped dinner (Fig 17).

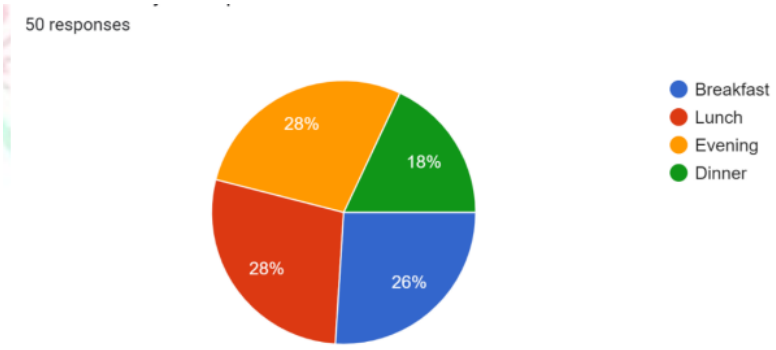

Figure 17: Meal skipped

15. **Feeling of worry about loss of control over eating**: In our study, there are 42% of people who are afraid that they will lose their control while eating, they worry that they should not eat more than their limit while eating. Twenty eight percent of the people are such who do not have any kind of fear, they will not lose their control while eating food. 38% of people feel that they may lose control over their food as depicted in figure 18.

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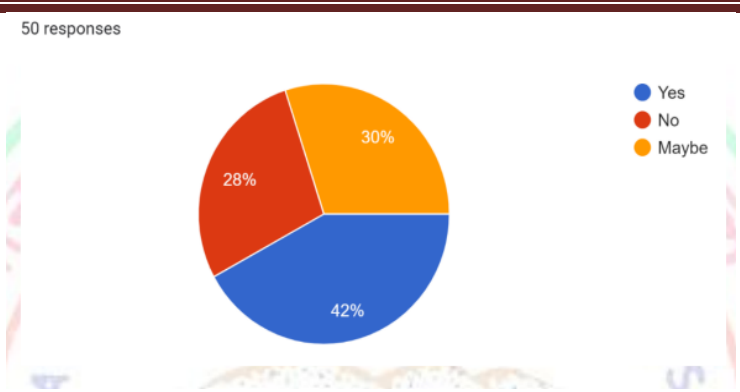

Figure 18: Feeling of worry about lost control over eating

16. **Eating unplanned meals:** As shown in figure 19, there are 16% people who eat anything at any time during the whole day without any time. There are 34% of people who eat moderate food throughout the day without any fixed time. There are 44% people who eat very little food and 6% people who do not eat anything in the whole day without any fixed time.

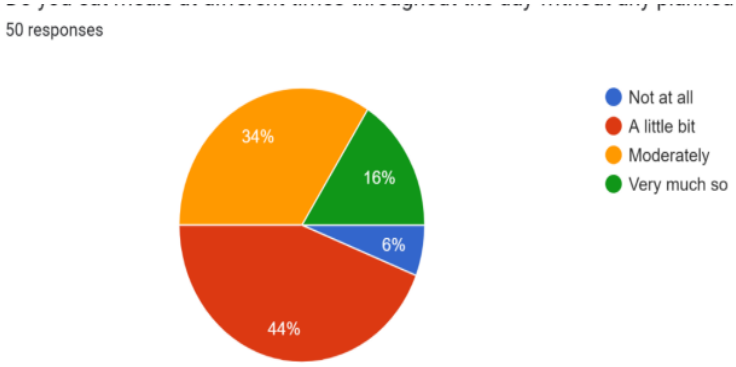

Figure 19: Eating unplanned meals

17. **Feeling frustrated by uncontrolled eating habits:** As shown in figure 20, 18% of people who were frustrated and not at all happy with their eating habits. There are 14% people who are not frustrated with their eating habits and 68% people feel that they are probably frustrated about their eating habits.

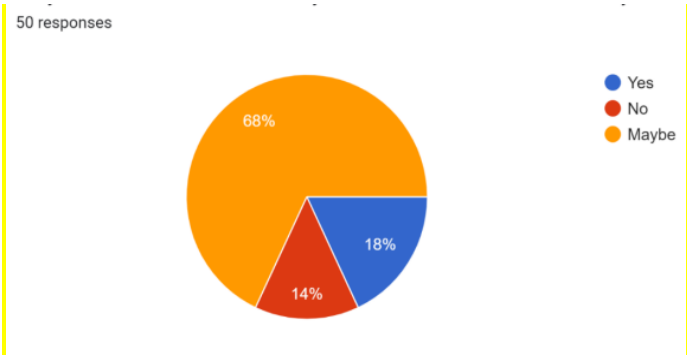

Figure 20: Feeling frustrated by uncontrolled eating habits

Conclusion

We did our study on the dietary effect of binge eating on children. We had taken 50 subjects. Then we made a questionnaire and shared with the parents. After data collection, it was found that the selected subjects ate anything at any time without any fixed schedule. And when they sit down to eat, they go on eating without any limit. Due to which they are slowly becoming victims of binge eating disorder. We made a diet chart keeping in view the response we got from the feeling we had made and we asked our subjects to follow it. Our subjects followed that chart, so there were some subjects whose weight changed. His weight decreased, he gradually reduced the habit without any fixed time when he used to eat anything, and he started eating food according to the diet chart. Our main objective of doing this survey was to observe the daily activities of our subjects. So that their habit of binge eating can be altered in order to reduce bad effects on their health. They had to be made aware that they should not eat anything without any fixed time, if they do not do this, their weight will increase and then they will become victims of serious diseases like heart disease, obesity etc.

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