The nutritional management of obesity

Andrea Vania (Italy)
Marie-Laure Frelut (France)
Véronique Nègre (France)
Daniel Weghuber (Austria)

Authors

Andrea Vania, MD, is a paediatrician, full researcher and aggregate professor at the Dept. MISU of “Sapienza” Rome University. Past-President of ECOG for the term 2010-2013, Past President and Honorary Member of EAPE/APEE, and member of several Italian scientific societies (SIO, SIO-Lazio, SIMA; SINUPE). Component for the term 2015-2019 of the CNSA (National Committee for Food Safety) of the Ministry of Health. Author or co-author of more than 600 items including published papers and lectures.

Authors

Marie-Laure Frelut, MD, MSc, is paediatrician, specialized into nutrition and childhood obesity. She spent most of her career in Paris Children University Hospitals. She is a founding member of Scope, past president of the European Childhood Obesity Group (ECOG), the editor of the ECOG's first free eBook on child and adolescent obesity and deserved the Nutrition award of the French Academy of Medicine. She is deputy chair of the clinical committee of the World Obesity Federation.

Authors

Veronique Negre, MD, is paediatrician, specialized into childhood obesity, member of ECOG. She actually works in Nice University Hospital (France). She is president of a French national association called APOP (Childhood Obesity Prevention and Take care Association) which participates in national working groups on pediatric obesity.

Authors

Daniel Weghuber, MD, is an alumni of Vienna Medical School. He is Professor of Pediatrics at Paracelsus Medical School (PMU) in Salzburg, Austria. Clinically, he works as a consultant at the Department of Pediatrics, heading the Division of Pediatric Gastroenterology, Hepatology and Nutrition and the Obesity Research Unit at PMU, focusing on metabolic comorbidities including glucose and fat metabolism (in particular disturbed insulin sensitivity and secretion) and phenotypes of preclinical atherosclerosis. Other areas of interest include orthopedic and psychological comorbidities, interdisciplinary diagnostics, mitochondrial genetics, lifestyle and pharmacological treatment as well interdisciplinary bariatric surgery of children and adolescents with obesity. In addition, is involved in several training and educational activities of health care professionals on a national and international level in regard to obesity management. He is currently elected president of the European Childhood Obesity Group.

Learning objectives

This course should allow you:

- To distinguish between the various causes that lead to overeating
- To be able to identify them and explain them to a given child or adolescent and its family
- To settle realistic goals and long term objectives
- To ask other specialists, such as psychologists or pedopsychiatrists to take care of some eating disorders that should not be treated by diet first.

Description of the course

The aim of this course is to allow a caregiver to consider the range of possibility that underlie deleterious eating behaviour and food choices in children or adolescents suffering obesity.

It shows how managing the diet is not a uniform process but the result of a step by step assessment of the individual problem, based on age, hedonic characteristics, familial and economic context.

It underlies how taking time and following up the patient are mandatory in order to reach a realistic and lasting objective.

Before starting.....Obesity is a complex disease!

- **Energy intake above energy expenditure is mandatory to generate obesity**

But

- Increased energy intake may result from *different mechanisms* leading to apparently similar consequences
- *Several associated mechanisms* may play a role within an individual child or adolescent

➢ **The putative causal mechanisms involved should be taken into account in order to adapt the therapeutic strategy to each individual case**

Dietary approach: General principle

The objective is therefore to obtain:

- a lasting change in the dietary habits of the child/adolescent and their family,
- with the overall aim of reducing energy intake.

Nutritional management
A comprehensive approach

BACKGROUND

1. Age and lifestyle
2. Eating behaviour
3. Food consumption
4. Economical and social constraints

An open discussion with the patient /family

Individual adaptation

Avoidance of additional burden

Duration

Dietary approach
Identification of difficulties and resources

Difficulties:

- size of the portions at meals
- eating between meals
- daily consumption of sugary drinks
- too rich and not varied enough diet
- unstructured eating patterns or skipping meals…

and their cause(s):

- unbalanced diet on offer
- failure to perceive satiety or high bitterness sensitivity
- psychological difficulties
- inappropriate educative attitudes
- family habits …

Resources

- Varied and balanced diet
- Changes already introduced
- Family and entourage already mobilized
- High motivation
- …

Dietary approach
Main difficulties and some tips about resources

The choice of foods: quantities should be evaluated

- How big is the plate?
- Is the child's helping as big as that of the parents, or other older children?
- Is the child given second helpings systematically any time he/she asks?
- Does the child help him/herself to things from the refrigerator?
- What does the child eat between meals?

Basic benchmarks can be used:

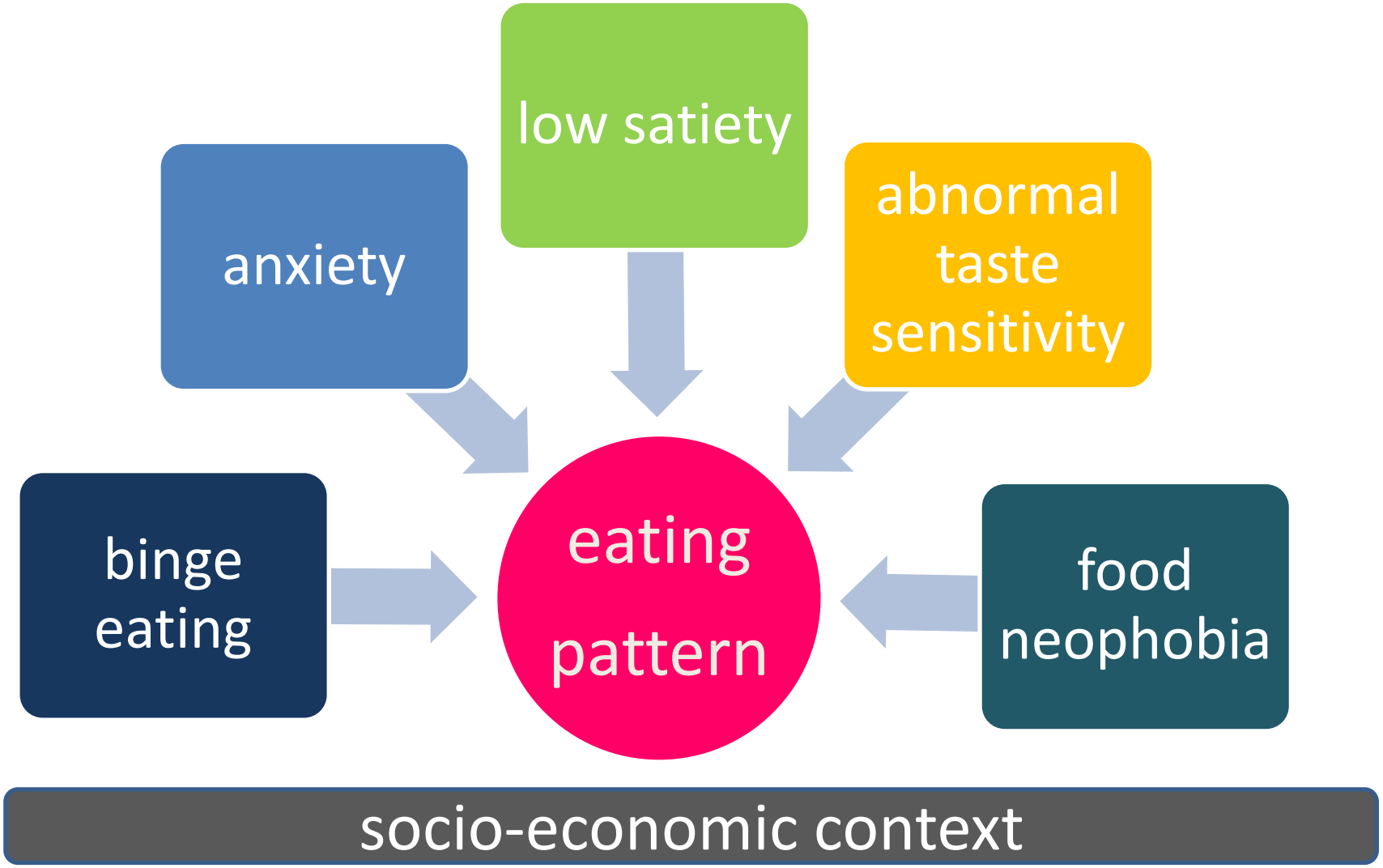
- Before the age of 10, the child's needs are less than those of adults
- Around the age of 10, the child's needs can be equivalent to those of a relatively less active adult woman
- The needs could increase considerably during growth spurts in puberty, especially for boys with high physical activity levels

Age and lifestyle

Evaluation before introducing any change

- Start from the actual situation
- Evaluate the educational attitude /family structure
- ***Explanations have to be appropriately given to the child himself → use easy-to-catch examples***
- ***Upgrade your explanations step by step***
  - Explain the benefit of sharing efforts between decreased energy intakes and enhanced energy expenditure
  - Use comparisons to fuel requirements
  - Enable parents and child to cope with the situation (**empowerment**)
- Use simple dietary questionnaires to be fulfilled at home over 1 or 2 weeks

What may cause abnormal eating pattern and excessive energy intakes?



What may cause abnormal eating pattern and excessive energy intakes?

Perceptions related to food: hunger, satiety, desire, enjoyment

Natural regulation can be disturbed by several factors:

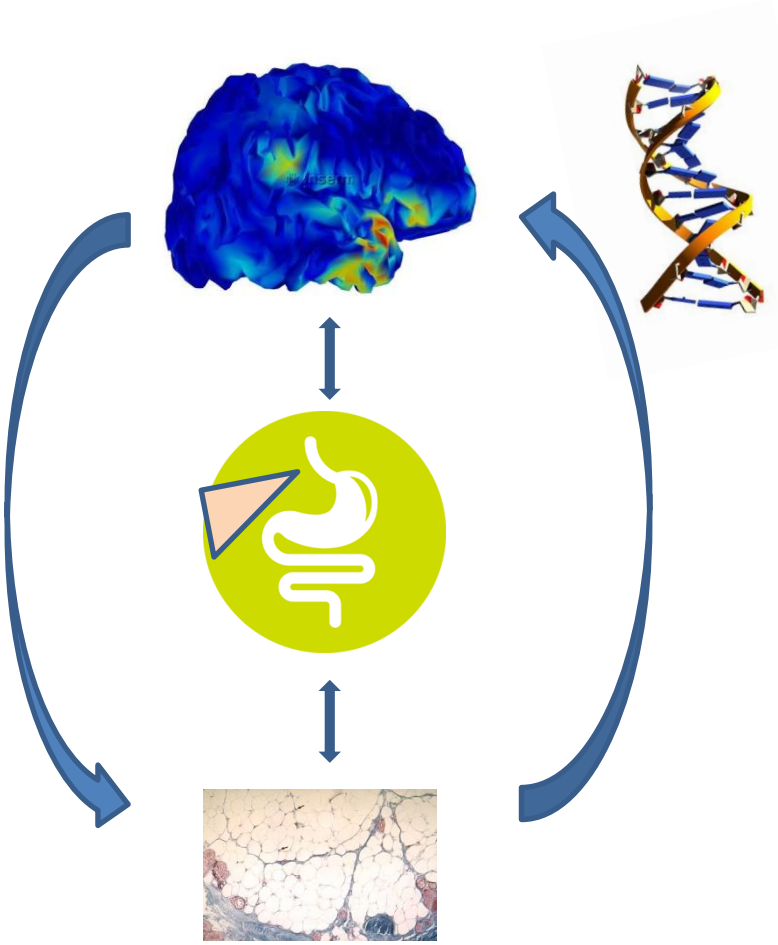
- Genetic and/or epigenetic disturbances
- Educational attitude of the family and entourage regarding diet, e.g. too much availability or too many restrictions
- Family habits in families of “good eaters”.
- Eating in front of the television or a screen
- Environmental factors including food preparation, the size of the portions, “pocket” formats
- Psychoaffective factors, such as states of anxiety or stress

All of these factors should be envisaged and explored during work-up and management in order to adapt the follow-up appropriately.

SIGNIFICANCE OF LOW SATIETY

The child/adolescent still feels hungry after consumption of a typical meal in normal circumstances

- ✓ He eats very quickly
- ✓ The process started early in life independently from any stress
- ✓ Some children may even cry because of hunger or crave
- ✓ Test meals



- **Genes mutations** ?
  - Leptin or leptin receptor (LEP, LEPR)
  - Melanocortine receptors (MC4R...)
- **Genetic syndromes ?**
  - Prader Willi
  - Bardet Biedl...

ENHANCING THE FEELING OF SATIETY

SEVERAL EXISTING POSSIBILITIES MAY BE MERGED

1. learning to distinguish between thirst and hunger
2. enhancing the consciousness of food consumption
3. reducing the temptation of repeated servings
4. slowing down the rate of ingestion
5. shifting from non solid and easy to swallow foods to harder to chew ones

ENHANCING THE FEELING OF SATIETY

BY (RE)LEARNING TO DISTINGUISH BETWEEN THIRST AND HUNGER

- Putting only water on the table and serving it
- Asking the child/adolescent whether he feels more thirsty or hungry
- Banning caloric drinks and soft low calorie drinks that blurs the process
- Taking into account that milk and juices are both foods and drinks, even though rarely perceived so by patients/families

ENHANCING THE FEELING OF SATIETY

BY ENHANCING THE CONSCIOUSNESS OF FOOD CONSUMPTION

- Sharing meals by the family at regular times and sitting at a table
- Turning off television, radio + banning games, tablets
- Deciding before hand the composition of the meal and the size of key portions for every family member
- Presenting servings one after another instead of all together
- Avoiding extra plates with food in the middle of the table (e.g. bread, cheese, chips, olives....)

ENHANCING THE FEELING OF SATIETY

BY REDUCING THE TEMPTATION OF REPEATED SERVINGS

- ✓ **Smaller dish size** makes smaller portions more acceptable to children
- ✓ **Adding vegetables before the main course, or with it**
- ✓ **Adding fruit as dessert**
- ✓ **Letting the "quick eater"** wait for other guests to have finished their plates
- ✓ **Bringing on the table** the amount of food necessary for THIS meal instead of the whole amount cooked

➔ ***allow to share in proportion to each individual's requirements***

HOW TO ENHANCE THE FEELING OF SATIETY ?

BY SLOWING DOWN THE RATE OF INGESTION

- Using bulky foods and longer to chew foods at the beginning and during the meal, such as vegetables and fruits

BY SHIFTING FROM NON SOLID AND EASY TO SWALLOW FOODS TO HARDER TO CHEW ONES

- traditional bread, not soft bread/brioche/cookies that melt in the mouth
- small pieces of cut meat instead of minced meat,
- whole fruit or slices of fruit instead of compote or fruit juices
- whole vegetables or roughly mashed ones instead of thin purees or soups

Taste sensitivity

Detection and appreciation thresholds of elementary tastes

Sugar Salt Bitterness Sourness Fat Umami

- **Lower sugar sensitivity** leads to increase the food content of sugar in order to reach a pleasant taste
- **Lower fat sensitivity** allows to eat high amounts of fat without detecting it nor feeling any disgust
- **Higher sensitivity to bitterness or sourness** leads to avoid many vegetables
- **Umami**: the relationship between genetic polymorphisms in umami receptors, umami taste perception and preference for foods with this taste has yet to be explored

Salt and sugar mask the fat content of foods

Increased consumption of salty or sweet and fat foods

Impact of low sensitivity to sugar

The subject likes very sweet foods and drinks

- Genetic form common in population of Sub Saharan African origin
- Early conditioning by sugar, honey, syrup, fruit juices use in early infancy
  - **The sugar content of the food and drinks should be managed**
  - **A progressive reduction is necessary**

Calorie free sweet beverages contribute to maintain high appetence for sugar, and should be avoided




Impact of low sensitivity to fat

The child likes high fat diet

- Most fat in food is added during preparation, either by industry or during home-cooking
- Sweet and salty taste masks fat content of otherwise inedible foods
- Most fat sources are cheap. Adding fat → selling low-cost foods
- The fat amount used for cooking is in great part a familiar/social habit

➢ **The goals are:**

- ***To reduce the amount of fat added for cooking***
- ***To empower the identification of fat added by industry, so to make healthier choices***




High sensitivity to bitterness

The subject avoids many vegetables

- A bitter taste is characteristic of some vegetable and plants
- Other vegetables (e.g. cabbages) have specific tastes, linked to their sulphur content

➢ **Some subjects cannot tolerate the taste of some fruits or vegetables but not of all of them**

➢ Some obese people are hypersensitive to bitter taste

➢ **The goals are:**

- ***To maintain or introduce consumption of unduly avoided vegetables***
- ***To respect the sensitivity and replace the avoided vegetables (e.g. spinaches, Brussels sprouts, endives...) with well tolerated ones (e.g. green beans, tomatoes....)***






Impact of food neophobia

To refuse tasting new foods or to suddenly refuse to eat previously well accepted foods

- **Complex behaviour**

  → ***narrow food choices***

  – Usual choices: mainly starchy and fat foods, dairies

  – sometimes: selection by colour, consistency, texture...

- **Physiological feature**

  – may last from around 2 up to around 10 years of age and is limited to some foods

- **Pathological feature**

  – early starting (<1 year of age)

  – long-lasting or severe neophobia

  → **psychological/psychiatric assessment mandatory**

Eating as expression of anxiety

Various types of anxiety may affect obese children and adolescents

Food is used to relax and feel comfortable

- Anxiety is often expressed in a specific context
  → School work, social link, separation from the parents...
  → Out of these circumstances, the anxiety level would be lower
- There are no signs of psychosis or severe depression
- **Note!** Sleep apnoeas are among the causes of anxiety

➢ **The goals are:**
  - **To explain the link between eating behaviour and anxiety**
  - **To treat anxiety as a priority**
  - **To make clear to patients/families that starting with a diet would increase the burden instead of relieving it**
  - **To ask for a psychological assessment and behavioural approach**

Inappropriate diets and risk of deficiencies

Diets should be balanced, tasty, varied, pleasant

Energy restriction relates to the appropriate energy intakes beforehand: too restrictive diets (below the levels required for the optimal BMI) must be considered as inappropriate

- **Nutrient deficiencies are common in obese children**
  - Iron, calcium
  - Vitamin D, folates, other vitamins
  - Essential fatty acids

Biological assessment may be required → *ad hoc treatment*

Interpretation: consider storage in adipose tissue and inflammation

Vitamin D supplementation during winter time according to area

No supplementation beyond RDAs

Inappropriate diets and risk of deficiencies

Diets should be balanced, tasty, varied, pleasant

Energy restriction relates to the appropriate energy intakes beforehand: too restrictive diets (below the levels required for the optimal BMI) must be considered as inappropriate

- **Unbalanced diets are prohibited**
  - Rich in lipids/avoiding CHO
  - Vegan diets
  - High protein content....
- **Very low calorie diets**
  - Exceptional indications: Prader Willi syndrome, others
  - Under strict medical specialized supervision
- **After bariatric surgery**
  - Follow-up by reference centre
  - Adaptation to the type of intervention

Inappropriate diets and risk of deficiencies

Diets should be balanced, tasty, varied, pleasant

Energy restriction relates to the appropriate energy intakes beforehand:

- *restrictive diets below the levels required for age, sex and physical activity level must be considered as inappropriate*

- **Simple messages citing equivalences may help to (re)-establish a correct approach to foods**
  - One plate of French fries has the energy equivalent of 3 plates of mashed potatoes + butter, or 5 plates of steamed potatoes alone.
  - 1.5 L of soda/fruit juice corresponds to 35-40 sugar lumps.
  - 1 handful of peanuts contains 3 tablespoons of oil

- **No food should be completely prohibited**
  - Deprivation of a foodstuff they like may incite the child to eat it in large quantities as soon as it is accessible, often in secrecy and guilt.
  - So-called “light” foods are not indicated in children.

Key points

- Take time to analyze the situation
- Refer to other specialists or reference centres as appropriate
- **Give feedback to the child/adolescent and parents**
- Introduce changes progressively, ensuring that they:
  - are realistic
  - have no negative effects on social links
  - are based on changes in recipes
  - respect family culture as much as possible
  - take seasonality into account
- **Do not assign precise weight objectives but rather pleasant lifestyle goals**
- Offer a regular follow-up

The ECOG's free eBook offers complementary readings

1. **L Penicaud** Brain – Adipose tissue relationship: early features
   http://ebook.ecog-obesity.eu/brain-white-adipose-tissue-relationship-early-features/
2. **S Issanchou, S Nicklaus** Sensitive periods and factors in the early formation of eating behavior

   http://ebook.ecog-obesity.eu/sensitive-periods-factors-early-formation-food-preferences/
3. **M Caroli** Junk food and obesity

   http://ebook.ecog-obesity.eu/junk-food-obesity/ http://ebook.ecog-obesity.eu/chapter-nutrition-food-choices-eating-behavior/junk-food-obesity/
4. **CM Hladik, P Pasquet, E Cohen** Taste and obesity

   http://ebook.ecog-obesity.eu/taste-obesity/ http://ebook.ecog-obesity.eu/chapter-nutrition-food-choices-eating-behavior/taste-obesity/
5. **V Sinopoulou, J Harold, J Halford** Meaning and assessment of satiety

   http://ebook.ecog-obesity.eu/meaning-and-assessment-of-satiety-in-childhood/
6. **L. Goossens, C Braet** To binge or not to binge?

   http://ebook.ecog-obesity.eu/to-binge-or-not-to-binge/

Questions

1. Eating in front of a screen (answer: is a bad thing)

- ❑ Is a good think because it allows to take time for eating
- ❑ Is a good think because you are paying attention to your feeling of satiety
- ❑ Is a bad think which induces overeating
- ❑ Is neither bad nor good

2. Sweet beverages (answer : do not provide feeling of satiety and should be avoided)

- ❑ Can be used indifferently instead of water provided they do not contain sugar but sweeteners
- ❑ Can be used only if they are made out of pure fruit juice
- ❑ Provide a good feeling of satiety because of the volume is higher than that of a fruit
- ❑ Do not provide feeling of satiety and should therefore be avoided

3. The short and restrictive diets in children and adolescents (answer : should be avoided)

- ❑ Are the best because their provide quick results
- ❑ Should be avoided because of quick relapse and risk of nutritional deficiencies

Questions

3. Which of the following food should be strictly banned in children or adolescent suffering obesity?(answer : none)

- ❑ Sugar
- ❑ Potatoes
- ❑ Ice creams
- ❑ Fried meat
- ❑ None

4. When facing a 10 years old child that dislikes “all vegetable”(answer : You try...,and you decide...)

- ❑ You accept the situation and hope that it will improve over time
- ❑ You try to assess which ones he dislikes and which ones he never tasted
- ❑ You decide with him of a progressive introduction of some of them

5. Which is the situation in which diet should not be offered and the adolescent orientated toward a psychologist ?(answer : binge eating)

- ❑ Binge eating
- ❑ Preference for very sweet foods
- ❑ Snacking instead of having regular meals