

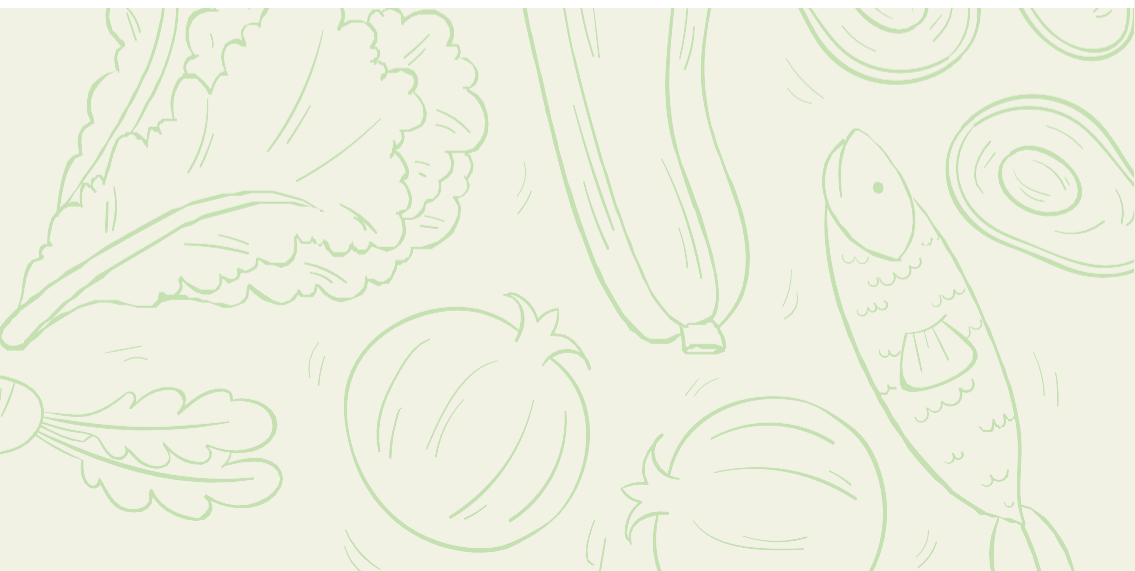


# **KETOGENIC DIET FOR CHILDREN**

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## **What Will You Find in This Guide?**



## 1- Frequently Asked Questions

- What is the Ketogenic Diet?
- How Does the Ketogenic Diet Work?
- For Which Types of Seizures is the Ketogenic Diet Useful?
- How Effective is the Diet in Controlling or Eliminating Seizures?
- How Long Does it Take for the Diet to Reduce or Eliminate Seizures?
- Will Anti-Seizure Medications be Reduced While My Child Continues the Diet?

## 2- The Ketogenic Diet Journey

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# Frequently Asked Questions



# What is the Ketogenic Diet?

The ketogenic diet is a high-fat, specialized diet used to treat seizures. To achieve high fat intake, oils such as olive oil, butter, coconut oil, and oils from nuts and seeds are used. In this diet, foods with carbohydrate content, such as sweets, bread, pastries, cereals, pasta, grains, fruits, milk, and dairy products, are either limited or removed. All foods must be carefully prepared and weighed on a sensitive kitchen scale accurate to 1 gram. For maximum benefit, every meal should be fully consumed.

The ketogenic diet was first used in the 1920s but remained in the background for many years due to the availability of medications for seizure treatment.



# How Does the Ketogenic Diet Work?

- This diet's specific combination of adequate protein, low carbohydrates, and high fats enables the body to use fats as an energy source. As a result, the body produces ketones.
- The ketogenic diet is tailored specifically for each child based on their clinical condition, age, height, and weight.
- It is monitored in collaboration with a specialist dietitian and a pediatric neurology expert.

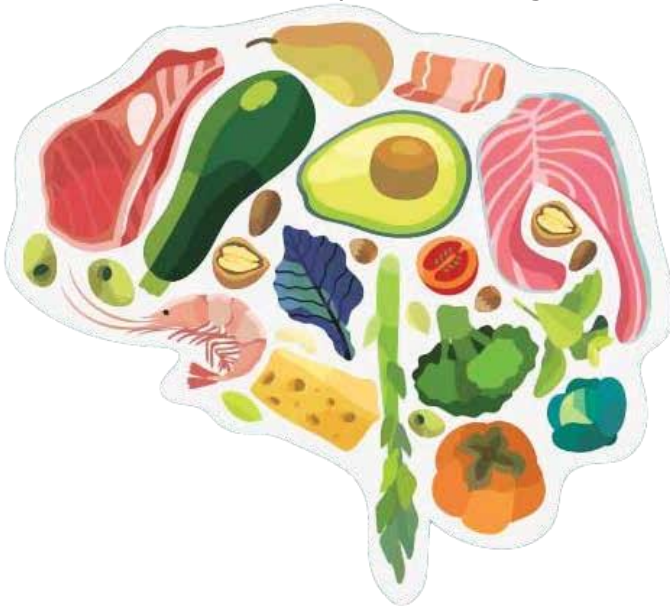
## For Which Types of Seizures is the Ketogenic Diet Useful?

- The diet is effective for various types of seizures and is not limited to any specific type.



# How Effective is the Diet in Controlling or Eliminating Seizures?

- Studies monitoring children treated with the ketogenic diet show that for one-third of them, seizure control exceeds 90%, with half of these children becoming seizure-free.
- For another one-third of the children, the diet results in a 50% reduction in seizures.
- The remaining one-third discontinue the diet due to ineffectiveness or difficulty in maintaining it.





**The ketogenic diet is a treatment option.**



# How Long Does it Take for the Diet to Reduce or Eliminate Seizures?

- The diet may take effect immediately or could take several months.
- Every child is unique, with different types and frequencies of seizures.
- To see the benefits of the ketogenic diet, it is necessary to remain on the diet for at least 3 months.



# Will Anti-Seizure Medications be Reduced While My Child Continues the Diet?

- If the child is taking more than one anti-seizure medication, one may be reduced when starting the ketogenic diet. If the child's seizures improve over time, the remaining medication can also be gradually reduced. Your doctor will inform you during follow-up appointments.
- **Note:** For drug-resistant epilepsy, dietary therapy provides the fastest and most effective results compared to other treatment methods.



# The Ketogenic Diet Journey?

- With the diet, your child may experience one or more of the following positive effects.
  - Reduction in the number of seizures
    - Decrease in seizure severity
      - Shorter seizure duration
  - Reduction in anti-seizure medications
  - Positive improvements in cognitive functions
    - Enhancement in motor skills

- The ketogenic diet is a treatment that requires close medical monitoring. Remember that the diet will be adjusted to allow for your child's growth and development over time. You will have frequent contact with your dietitian throughout the treatment process.
- Families with children on the ketogenic diet should be mindful that their child has specific dietary needs and act accordingly. Some children may go through a lengthy adjustment period, during which they may ask for different or additional foods or exert pressure on the family. In such cases, support from a psychologist on the team may be beneficial. You can also work with your dietitian to develop recipes that your child will enjoy.





# Ketogenic Diet Program

- If your doctor determines, based on clinical findings, that the ketogenic diet is an effective treatment for your child, the therapy may continue for up to 3 years. During this period, it is crucial that your child is closely monitored by the medical team. These are the steps you will take to ensure the diet is managed safely.

- Neurological assessment and referral to the  
Ketogenic Diet Program

- Meeting with the dietitian: Both parents and family members may be asked to attend. The diet will be explained in detail, and the dietitian will assess your child's nutritional needs.
- Laboratory tests as prescribed by your child's neurologist.
- In the following period, you will have monthly meetings with the dietitian, and check-ups with the doctor will be scheduled at the start of the diet, at 1, 3, 6, 9, and 12 months, and then every 6 months thereafter.

# Supply List

## 1- Kitchen Equipment:

- ✓ Small plastic containers for storing small amounts of food
- ✓ Leak-proof plastic bottles for liquids
- ✓ Small plastic spatulas to scrape each bite of food
- ✓ Flexible plastic straws
- ✓ Small microwave-safe plates
- ✓ Small cooler or insulated lunch bags for travel
- ✓ Insulated bottles or containers for school lunches or travel
- ✓ Blender



- ✓ Tape/labels for labeling food containers
- Small ✓ pans for cooking individual portions
- 2- Tare-sensitive precision kitchen scale for weighing food, accurate to 0.1 gram. For measuring liquids; measuring cup marked with milliliters or graduated cylinder

### 3- Tracking equipment:

- ✓ Bathroom scale for weighing your child weekly
- ✓ Ketone sticks for urine ketone
- ✓ Blood ketones and glucose monitoring meter - optional (talk to your doctor)



# Golden Rules

- ✓ ***Prepare only the foods specified in the ketogenic diet.***
- ✓ ***Encourage your child to eat every bite at every meal.***

***Encourage your child to finish a meal within 30 minutes.***

***Use a small spatula to spread a drop of oil in the preparation and eating bowl.***

***Encourage your child to drink all recommended fluids.***

***Give your child the prescribed vitamin and mineral supplements every day.***

***If the child is extremely hungry between meals, allow one "free food" snack a day.***

***Keep pet food, medicines and toothpaste out of reach.***

***Do not use liquid or chewable medicines without consulting your doctor.***

# Ketogenic Monitoring Guidelines

- Weigh your child once a week on the same scale wearing the same type of clothing.
- Check blood or urine ketones/sugar twice daily during the first months of the diet and when any diet changes are made.
- Track and note blood or urine ketones/sugar, weight and seizures in the treatment diary
- Attend regularly scheduled ketogenic diet follow-up appointments.

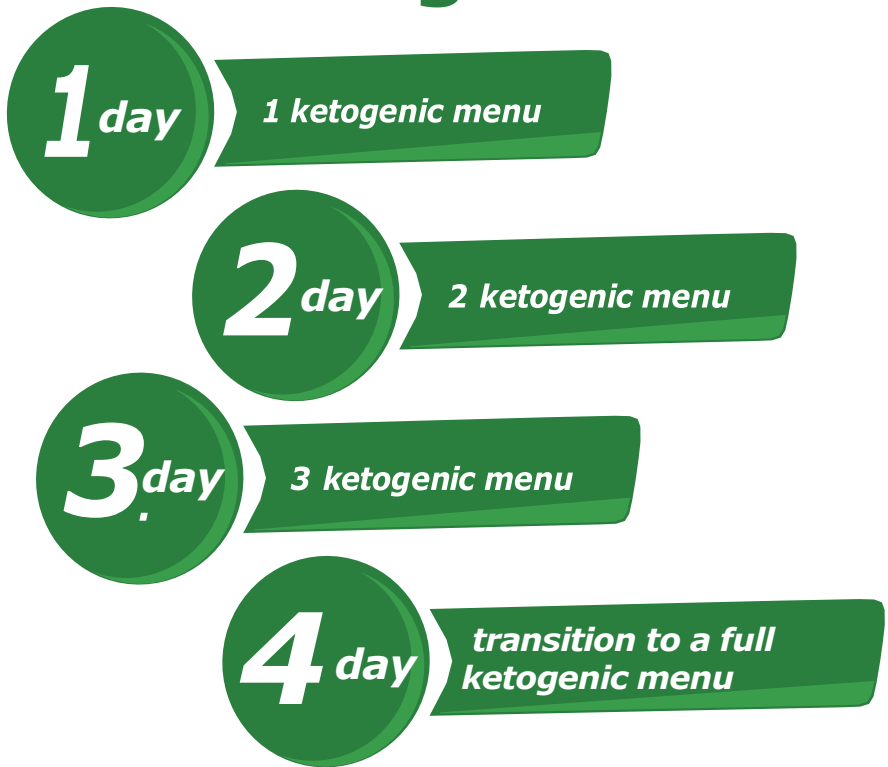


# Ketogenic Diet Designing

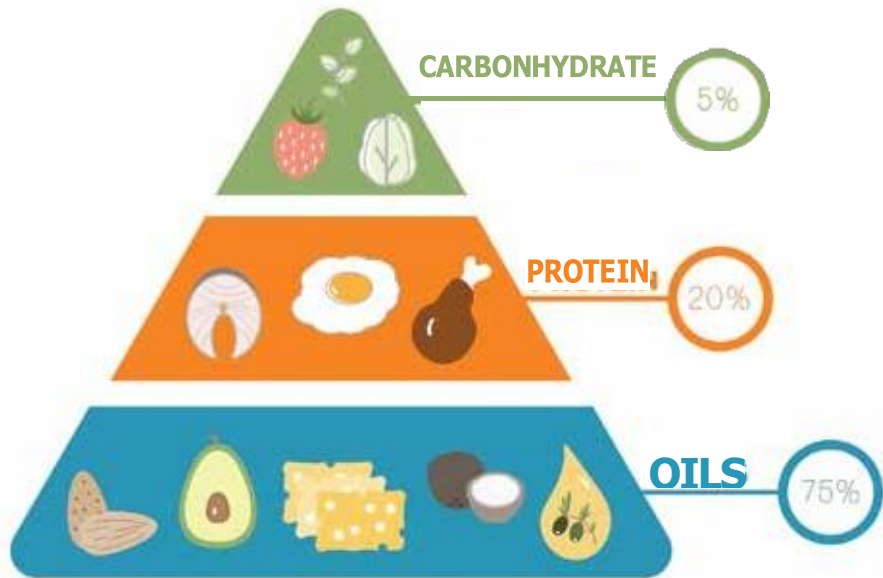
- The guide in the image will give you ideas on how to design ketogenic diet meals.
- To make a meal, choose one food from each of the food groups listed.
- Many meals can be made from these food combinations.
- The dietitian will calculate the amount of each food that needs to be weighed for your child's meal.



# Stages of Starting a Diet



- The diet is started with ratios such as 3:1 or 4:1 determined by your doctor.
- During the duration of the diet, ratios such as 2:1, 2.5:1 can be changed according to the child's blood ketone levels.
- 3:1 ratio means; 3 units of energy from fat to 1 unit of energy from carbohydrate + protein.



<b>Carbohydrate</b>	<p>GroupA vegetables</p> <p>GroupB vegetables</p> <p>Fruit containing 10% sugar</p> <p>Yogurt from fruit containing 15% sugar</p> <p>Milk</p> <p>Honey-jam-molasses</p>	<p><b>Bread</b></p> <p>Rice - bulgur - pasta Cereals</p> <p>Flour and flour products</p> <p>Potatoes Legumes Soups</p>
<b>Protein</b>	<p>Egg</p> <p>Chicken breast/wings</p> <p>Cutlets</p> <p>Tuna Fish Minced Beef</p> <p>Fish Fillet</p>	<p>Cheese</p> <p>Salmon</p> <p>Bacon</p> <p>/ Ham</p> <p>Sausage</p> <p>Sausage</p> <p>Doner</p>
<b>Oils</b>	<p>Olive oil Coconut oil</p> <p>Avocado oil</p> <p>Flaxseed oil</p>	<p>Almond Oil</p> <p>Butter</p> <p>Clarified butter</p> <p>Mayonnaise</p>

**Vegetables: can be fresh, canned or frozen .  
Measure raw ( C ) or cooked ( P ) as indicated .**

### **Group A vegetables**

*You can use twice the specified amount*

- Asparagus / P
- Radish / C
- Beetroot and beet leaves/ P
- Cabbage/ C
- Sauerkraut /C
- Celery / P or C
- Summer squash / P
- Chicory / C
- Chard / P
- Cucumber / C
- Tomato / C
- Tomato juice / C
- Green Pepper (C or P)
- Cress / parsley / lettuce / arugula / arugula / purslane / C

### **Group B vegetables**

*Use the specified amount*

- Beetroot / P
- Kohlrabi P
- Mushrooms Broccoli/ P
- Brussels sprouts/ P
- Carrot ( P or C )
- Onion ( P or C )
- Cauliflower / C
- Kale / P
- Spinach/ P
- Tomato / C
- Green beans/ P
- Winter squash / P
- Red capia pepper
- Leek



# Hidden Carbohydrates

Carbohydrate is another name for sugar. In the ketogenic diet, carbohydrate sources such as vegetables and fruits with natural carbohydrate content are used. Foods containing added sugar are avoided. The labels of purchased products must be read and foods or medicines containing hidden carbohydrates should not be purchased.

**Just because a product is labeled 'sugar free' does not mean that it does not contain carbohydrates!**

**If the products you buy for your child contain the following 'hidden carbohydrates', you should not use them!**

- **Corn syrup**
- **Corn starch**
- **Dextrin Dextros**
- **Disaccharide**
- **Fructose**
- **Glucose**
- **Glycerin**
- **High fructose corn syrup**
- **Invert sugar**
- **Lactose**

- **Levulose**
- **Maltodextrin**
- **Maltose**
- **Malt sugar**
- **Sugar cane**
- **Monosacchar**
- **ide**
- **Propylene**
- **glucose**
- **Sorbitol**
- **Sorghum**
- **Starch**
- **Sucrose**
- **Syrup**
- **Xylitol**
- **Xylose**



# Non-carbohydrate components

- 
- Cellulose
- Hydroxymethylcellulose
- Polyethylene glycol
- Aspartame
- Aculfamine potassium
- Carboxymethylcellulose
- Microcrystalline
- cellulose
- Magnesium stearate
- Saccharin

If the products you buy for your child contain the carbohydrate components listed above, you can use them.

# Oil Tips

Most of the calories in the ketogenic diet come from fat.

Here are some ways to incorporate fats into meals;

- Reheat the cooked meat in the butter in a small skillet. The butter will be absorbed into the meat.
- Mix a pinch of seasoning with 2-3 tablespoons of softened butter or olive oil. Use in dishes to enhance the flavor of vegetables or meat.

You should use very little of the amount of oil you will use in the meal for cooking and pour the remaining amount over it raw.



# Mayonnaise

Making fats more palatable and different on the ketogenic diet can increase a child's adherence to the diet.

Mayonnaise made with coconut, avocado or olive oil is one of the best choices.

You can mix mayonnaise with chopped meat such as chicken, turkey or beef.

You can make egg salad or tuna salad with mayonnaise.

You can prepare snacks with carrot or celery sticks.



# Free foods

Free foods are foods that contain few or no calories or fat calories. These foods are included to make meals more interesting.

**Sweeteners** - Ketosis leads to reduced sweet cravings and should be calorie and carbohydrate free.

- Erythritol
- Stevia

**Drinks** - should be given in the recommended amount

- Water or ice cubes.
- Water flavored with sweeteners.
- Flavored bottled drinks without caffeine, carbohydrates and calories.
- Herbal tea - decaffeinated Soda (plain),
- Sugar-free lemonade (e.g. uludağ
- sugar-free lemonade) Sugar-free
- cold teas (e.g. Lipton light ice tea)
- Sugar-free soda (e.g. çamlica gazoz light)

# Other Free Foods

One of the following can be eaten every day;

- 25 g lettuce
- 50 grams of cucumber
- 3 small (ripe) black olives
- 1 black walnut
- 1 macadamia nut
- 1 pecan
- 3 nuts
- **Spices : It can be used to enhance flavor,**
- Sugar-free Jell-O
- Sugar-free chocolate







# Possible Side Effects of the Ketogenic Diet

- Constipation
- Nausea, vomiting, diarrhea
- Fever, pain
- Hypoglycemia
- High ketone levels
- Increased seizures



**Constipation** is the most common side effect of the ketogenic diet. This is because the diet is low in fiber and high in fat. Constipation can cause abdominal pain, make your child uncomfortable, and may even lead to an increase in seizures.

**Constipation Treatment:** If there is no bowel movement within 3 days, treatment may be necessary. Contact your pediatric neurologist to discuss adding non-carbohydrate laxatives.

**To Prevent Constipation:**

- To increase the fiber content of the diet, add 25 grams of lettuce from the list of free foods to meals
- Encourage your child to drink all the fluids provided in the diet
- Encourage your child to sit on the toilet every morning after breakfast
- Massage the child's abdomen and anal area with coconut oil
- Contact your dietitian to request the addition of coconut oil to your child's diet





### **Nausea, Vomiting, Diarrhea**

- Give your child only clear fluids.
- To prevent dehydration, give your child clear fluids every hour while awake.
- Do not limit the amount of fluids.
- If your child can tolerate it, add broths like beef, chicken, or bone broth soups to their diet.
- Contact your dietitian.

### **Fever or Pain**

- Avoid medications in syrup or chewable tablet form.
- The carbohydrate content of swallowable adult tablets is very low.
- Your pediatric neurologist will provide the necessary medications in this form.



## High Ketone Levels

It occurs when your child's body produces too many ketones. A ketone level of 7 mmol/L or higher indicates high ketones.

- Rapid, shallow breathing
- Facial flushing
- Vomiting
- Excessive drowsiness
- Nausea

## High Ketone Level Treatment:

- Give your child 30 mL of apple juice, fruit juice, or sugary water. If symptoms persist after 20 minutes, give another 30 mL of apple juice.
- Continue giving fruit juice or sugary water every 30 minutes until the ketone level falls to the 4-6 mmol/L range, then contact your pediatrician.
- If you cannot reach your doctor, take your child to the emergency room. Be sure to inform the emergency doctor that your child is on a ketogenic diet. If IV fluids are required, specify that a non-sugar-containing saline solution should be used.




## Hipoglisemi

A blood glucose level below 50 mg/dL indicates that your child is experiencing hypoglycemia. The following symptoms may occur:

- Pale skin
- Sweaty forehead
- Rapid pulse
- Dizziness
- Nausea
- Excessive drowsiness

## Hypoglycemia Treatment:

- Give your child 15 mL of apple juice, fruit juice, or sugary water.
  - After 30-45 minutes, take a measurement. Continue giving fruit juice or sugary water every 30-45 minutes until blood sugar rises above 50 mg/dL.
  - The symptoms above should improve within minutes.
  - If symptoms persist, contact your ketogenic diet team.
- 



## **Increased Seizures**

If there is a sudden increase in seizures at the beginning of the diet, there is no need to worry. The Ketogenic Diet Team will help you identify the cause of the sudden seizures and make adjustments to the diet if necessary.

### **Causes of Increased Seizures:**

- Eating something not allowed on the diet
- Not finishing a meal
- Teething
- Constipation
- Catching the flu or another illness
- Starting a new medication
- Missing a dose of anti-epileptic medication
- Reduced effectiveness of a seizure medication
- Gaining too much weight
- Changes in diet calories or ratios



# Special Products:

- Some products you use for your child should be special.
- Products that come into contact with your child's skin should not contain carbohydrates or hidden sources of carbohydrates.
- Extra attention should be given to products like shampoo, soap, wet wipes, cream, sunscreen, lip balm, diaper rash cream, and toothpaste, as the carbohydrates in these products can be absorbed through the skin and may affect ketone levels.
- For detailed information, you can visit the website [charliefoundation.org](http://charliefoundation.org)

## **Oral care solution (mouthwash) for children who have difficulty with tooth brushing:**

### **Ingredients:**

- 60 cc water
  - 1 drop of peppermint oil
  - Half a teaspoon of baking soda
  - Mix all ingredients.
- Shake before each use.





Num ber of Days	Date	ŞEKER		Ketone		Daily Meal Count	Weight Information	Seizure Status	Explanations
		Morning	Evening	Morning	Evening				

Daily Tracking Chart

## ASSOC. DR. CANAN KOCAMAN

Dr. Canan Kocaman works as a specialist in Pediatric Health and Diseases and Pediatric Neurology. She completed her medical education at Istanbul Medical Faculty, her Pediatric Health and Diseases specialization at Bakırköy Children's and Maternity Hospital, and her subspecialty training at Marmara University Medical Faculty. During her compulsory service in Diyarbakır, she served as the only Pediatric Neurologist covering 11 provinces in the region. She organized courses in neonatal neurology and neuromuscular diseases to support the education of pediatricians in the area. Dr. Kocaman has specific training in neurological follow-up for high-risk infants and holds a certification in general movement analysis, showing particular interest in this area. She is also the practitioner of the ketogenic diet treatment for resistant epilepsy, a protocol developed at Johns Hopkins University in the United States, and has a special focus on treatment-resistant epilepsy cases. She founded the high-risk infant and early intervention unit at the Metin Sabancı Spastic Children's Foundation, where she served on the academic board, organized congresses, and participated in scientific projects. As of February 2024, she holds the title of Associate Professor, with 11 international and 22 national publications. She has authored three national book chapters and contributed to one international pediatric neurology book translation. Dr. Kocaman has presented 48 oral and poster presentations at various national and international congresses. She teaches medical students in both English and Turkish at Okan University's Medical Faculty, where she serves as an Assistant Professor. Additionally, she provides consultation and outpatient services in Pediatric Neurology at various hospitals. Dr. Kocaman also offers online medical consulting for AutoTrainBrain, a neurofeedback application developed to address learning difficulties and dyslexia in children, and serves as the lead researcher for a related TÜBİTAK research project. She operates her own clinic in Kadıköy Caddebostan, where she and her team, including a psychologist, dietitian, EEG technician, and pediatric physiotherapist, provide comprehensive care for patients.

## UZMAN DİYETİSYEN DEMET ÖZELGÜN ÖZSU

She completed her primary and secondary education in Gaziantep-Nizip. She moved to Istanbul for university and graduated from the Department of Nutrition and Dietetics at Istanbul Medipol University in 2015. In her final year, she began a master's degree through an integrated program. Three months after graduation, she worked at a private clinic in Nişantaşı for six months. Due to her master's thesis on bariatric surgery, she decided to specialize in this field and began working as a dietitian at a private bariatric surgery clinic in 2016, where she followed the pre- and post-operative nutrition of bariatric patients for three years. During the same period, she conducted patient follow-up for her master's studies at Cerrahpaşa Medical Faculty and Ankara Numune Training and Research Hospital. In 2017, she submitted her master's thesis, earning her specialist title. Her thesis focused on reducing liver volume with the ketogenic diet before bariatric surgery. Since late 2019, she has continued her profession independently and opened her own office. In 2020, she also began providing corporate nutrition consulting, offering services within Burgan Bank between 2020 and 2023. Since 2021, she has been working as a corporate dietitian under Kibar Holding on certain days of the week. In 2022, she expanded her expertise to include pediatric dietetics. Since February 2022, she has been working with Dr. Canan Kocaman on applying the ketogenic diet for pediatric epilepsy and the modified Atkins diet for school-aged adolescents unable to follow a strict ketogenic diet. She also provides consultations for children with eating disorders, obesity, and growth and developmental delays. Additionally, she is a board member of the Metabolic and Bariatric Surgery Dietitians Association (MBCDD) and a member of the International Federation of Surgery for Obesity (IFSO). She continues her professional development by attending courses and seminars.







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