PARENTS' KNOWLEDGE OF THE USE OF THE KETOGENIC DIET IN THE TREATMENT OF EPILEPSY IN PEDIATRIC PATIENTS

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ABSTRACT
Epilepsy is a disease of the nervous system. Some cases of epilepsy are resistant to pharmacotherapy. One of the treatment methods is the ketogenic diet, which is characterised by a low carbohydrate content in favour of fats. The aim of the study was to assess the level of knowledge of parents of children with epilepsy regarding the ketogenic diet. Conducted between January and March 2025, the study involved 62 parents of children with epilepsy. Parents of children diagnosed with epilepsy at an early age more frequently demonstrate a knowledge of the main principles of the ketogenic diet. Respondents perceive the ketogenic diet as a form of treatment. Knowledge of the contraindications to the ketogenic diet is limited, and depends primarily on the respondents' level of education. Respondents are aware of the necessity of implementing the ketogenic diet under the supervision of a physician and a clinical dietitian.
KEY WORDS: *ketogenic diet, epilepsy, children, parents*.

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Introduction

Epilepsy is a disease of the central nervous system (CNS). The word epilepsy comes from the Greek word *epilambanein* (to attack, to quiver). It belongs to a group of chronic diseases characterised by reflex and unprovoked epileptic seizures. Epilepsy and epileptic seizures share a common denominator. Epilepsy is characterised by neurological disorders, while epileptic seizures are characterised by transient neurological disorders. Therefore, it is important to know the definitions of both epilepsy and epileptic seizures, as this is important for communication between medical personnel, and for diagnostic and differential diagnosis (Epilepsies in children, young people and adults, 2025). Epileptic seizures are caused by disturbed, short-term, and excessive synchronisation of brain cell functions (CNS dysfunction), leading to epileptic episodes with a sudden onset and distinct termination. Defining the characteristics and symptoms of epileptic seizures is complicated, because there is a wide range of seizure symptoms, dependent on several factors (Gajewski et al., 2021), including the location of abnormal discharges in the brain, sleep and wakefulness stages, and medication use. Additional (clinical) symptoms (Auvin et al., 2025; Gajewski et al., 2021) associated with epileptic seizures include disturbances of consciousness, disturbances in emotional perception, impaired autonomic and sensorimotor functions, abnormal behaviour, memory impairment, and cognitive impairment. According to the International League Against Epilepsy (ILAE), cognitive deficits associated with seizures

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can include problems with attention, memory, concentration, emotions and speech. Therefore, epilepsy is not a single disease entity, but rather a set of abnormalities in normal brain function (Fisher et al., 2014).

Epilepsy is defined as a persistent change in the brain that increases the risk of epileptic seizures (Zuberi et al., 2022). In 2014, the ILAE and the International Bureau for Epilepsy (IBE) defined epilepsy as a brain disorder in which several conditions must be met (Fisher, 2015; Rejdak et al., 2022): 1. The occurrence of two reflex or unprovoked seizures within 24 hours of each other. 2. Diagnosis of an epileptic syndrome based on clinical findings, electroencephalography (EEG), and other supporting tests. 3. Experience of an unprovoked or reflex seizure with an estimated recurrence risk of approximately 60%, with subsequent seizures after two unprovoked seizures within a ten-year period. In addition to the definition of epilepsy, the ILAE also defines drug-resistant epilepsy. Drug-resistant epilepsy is diagnosed when two consecutive attempts at drug interventions, either as monotherapy or adjunctive therapy (well tolerated, appropriately selected and appropriately administered), fail to achieve sustained and complete seizure control. Two criteria have been proposed for the assessment of the minimum duration of remission: a period of 12 months, or three times the interictal interval from before treatment initiation (corresponding to the 95% confidence interval). In a specific case, when applying both criteria, the longer period should be chosen (Fisher et al., 2014). The Epilepsy Section of the Polish Neurological Society (Polskie Towarzystwo Neurologiczne, PTN) has accepted the definition of epilepsy and drug-resistant epilepsy proposed by the ILAE (Fisher et al., 2014; Gajewski, 2021). The course of epilepsy can vary over time, even in a single patient, requiring careful diagnosis and detailed description in each individual case.

Aim of the study

The aim of the study was to assess the level of knowledge of parents of children with epilepsy regarding the ketogenic diet. The authors wanted to know whether the respondents are familiar with the main principles of the ketogenic diet, whether they know that the ketogenic diet is a form of treatment, whether they know the contraindications to the ketogenic diet, and whether they are aware of the necessity of implementing the ketogenic diet in their children under the supervision of a physician and a clinical dietitian.

Material and methodology of the study

The study, conducted between January and March 2025, involved 62 parents of children with epilepsy. The study group size was influenced by the purposive selection of respondents: these were parents of children receiving dietary care at a rehabilitation centre dedicated to epilepsy. Respondents were informed of the purpose of the study, which was to learn about their opinions, stances and knowledge about the use of the ketogenic diet in children, and they provided written consent to participate in the study.

A diagnostic survey was used as the research method. The research tool consisted of a custom-designed questionnaire with 24 closed-ended questions. The first four questions concerned the sociodemographic data of respondents. The next section addressed epilepsy and the principles and assumptions of the ketogenic diet in epilepsy treatment. Respondents provided their responses during their visit to the dietary clinic, selecting answers in an electronic form accessed via a tablet. The study was anonymous and voluntary, and the responses were analysed in aggregate form. Approval for the study was obtained from the Bioethics Committee and the centre's management.

This study was conducted as part of efforts to improve the quality of care provided by the dietary clinic. It was diagnostic in nature, aimed at providing a deeper understanding of the needs of patients and caregivers of epilepsy patients regarding the use of the ketogenic diet. The survey questionnaire was prepared based on previous findings from interviews with patients and their caregivers, formalising questions previously asked during visits. The questionnaire was not additionally standardized, due to the preliminary and small scale of the study. The authors fully acknowledged the methodological limitations of the study, and the fact that the conclusions drawn from it apply only to a small group studied at a clinic dedicated to epilepsy patients.

Data analysis was performed using Statistica version 13.3. The chi-square test of independence (χ^2) was used to analyse the relationship between categorical variables. The test was designed to test for statistically

significant relationships between demographic characteristics and respondents' responses regarding knowledge and attitudes towards the ketogenic diet. Spearman's rank correlation (rho) was used to assess the relationship between ordinal variables and between quantitative and ordinal variables. In each analysis, the level of statistical significance was set at $p < 0.05$. For significant results, the exact values of the test statistics and degrees of freedom were indicated.

1. The theoretical background

Epidemiological data indicate that recurrent and unprovoked epileptic seizures among people under 18 years of age worldwide affect 41 to 187 children per 100,000 (Camfield et al., 2015). Based on international epidemiological data, the incidence of epilepsy in infancy reaches as high as 81 to 146 children per 100,000 cases (Zuberi et al., 2022). In later ontogenetic periods, the incidence increases by 30% to 50% in girls up to five years of age. In turn, in children over five years of age, the risk of the disease increases by 20% to 30% in boys. Considering the available data from different periods, boys are more susceptible to the disease (Sawicka, 2020). Further international publications and research studies covering the years 1993 to 2017 indicate that the incidence of epilepsy has been decreasing in recent years (Zhang et al., 2025; Cockerell et al., 1996; Hauser et al., 1993). The reduction in the incidence of epilepsy is primarily due to the differentiation of epileptic seizures from non-epileptic seizures. This differentiation has become more accurate thanks to the development of video-electroencephalography (video-EEG) and video-monitoring of brain function during sleep and wakefulness (Berg et al., 2013). It has also been noted that the decline in the incidence of epilepsy is due to the increased control of modifiable risk factors, and the introduction of the vaccine against Haemophilus influenzae infections (Berg et al., 2013). According to epidemiological data, the annual mortality rate due to epilepsy in children under 18 years of age is 0.4–4/100,000, and is six times higher in children diagnosed in infancy (Christensen et al., 2015). Furthermore, deaths in adolescents with metabolic or structural epilepsy in the first year of life were twice as frequent as in children with other epileptic etiologies (Starck et al., 2026).

The ketogenic diet in the treatment of epilepsy

The ketogenic diet (KD) is a restrictive diet in which the primary nutritional components are high-fat, low-carbohydrate foods. It is essential that it also contains protein (however, the amount needed should be calculated individually, taking into account individual health status). The weight ratio of fat to protein and carbohydrates is crucial in this regard. This ratio is 4:1, meaning that for every 4 g of fat, 1 g of protein and carbohydrates is used. In this case, 86% to 90% of the body's energy comes from fat, and 10% to 14% from protein and carbohydrates (Dudzińska, 2015).

The goal of the KD diet is to change the body's metabolic state. During the diet, the production of ketone bodies, which include acetone, β-hydroxybutyrate and acetoacetate, increases. Ketone bodies are produced during the body's so-called 'starvation' state. This process occurs in the liver. Ketone bodies are produced from long and medium-chain fatty acids (Nelson et al., 2023). An important term used during the KD diet is nutritional ketosis, which refers to the increased synthesis of ketone bodies (35). Ketone body production is also increased by fasting and physical activity. Furthermore, including fasting and physical activity in the KD diet increases the production of ketone bodies, which, alongside glucose, are used as energy for cells (20). Nutritional ketosis is a mild condition. It results from a change in diet, which alters the body's metabolic pathway due to a high fat intake and a low carbohydrate intake. Therefore, fats can be considered the primary energy substrate (Zhu et al., 2022).

Increased ketosis is a complex process, and is not fully understood. It should be noted that ketone bodies provide energy for skeletal and cardiac muscles, but carbohydrates are essential for the brain, liver and kidneys. The brain, in turn, adapts to the metabolism of ketone bodies. The KD diet's nutritional regimen is complex and demanding. Exceeding the maximum carbohydrate intake, or consuming too much protein, inhibits the production of ketone bodies (Pondel, 2020).

The main types of KD diet include (Dudzińska, 2015): 1. Very low-calorie KD diet – lasts up to 12 weeks. It is a calorie-restricted diet, with a total caloric intake of 600 to 800 kcal. It is characterised by a low protein content of ≥75 g/day and carbohydrates of 30–50 g/day. Daily fat intake should be 20 g. Omega-3 fatty acids are a good source of fat. 2. Low Glycemic Index Diet (LGI) – this type of diet requires a daily carbohydrate intake of 60–80 g, which should come from low glycemic index sources. Following a KD diet is associated with the possibility of complications, and therefore requires medical supervision. Side effects of the KD diet include headaches, hypovitaminosis, hyperlipidemia, fatigue, dehydration, electrolyte imbalance, constipation, gastrointestinal symptoms (vomiting and diarrhoea), and electrolyte imbalance (Dyńka et al., 2026; Pondel et al., 2020). The KD diet is restrictive and low in nutrients, so vitamin and mineral supplementation is important. A limited intake of fruit and vegetables reduces levels of folate and other B vitamins, biotin, vitamin E, folic acid, flavonoids, and vitamins C and D. These elements are important for metabolism and antioxidant function. Additionally, a KD diet should be supplemented with calcium, magnesium, potassium, phosphate, selenium, manganese and zinc, as these trace elements affect muscle cell function and the nervous and cardiovascular systems (Camfield, 2015). A KD diet should also include polyunsaturated fatty acids: omega-3 and omega-6, which improve nervous and cardiovascular system function. They have anti-epileptic properties, and reduce the risk of hyperlipidemia (Gawęcki et al., 2022).

Using a KD diet in pediatric patients is challenging. Parents must be resourceful and require discipline from the child. For newborns and infants, the current pharmaceutical market offers special preparations that require the use of a gastric tube or enteral feeding. Parents of children who are already able to swallow independently can use diet guides translated into Polish (after prior education by a clinical dietitian) (Borowicz-Reutt et al., 2024). The KD diet is a proven therapeutic method in the treatment of epileptic encephalopathies in childhood, including Dravet syndrome, Lennox-Gastaut syndrome and Doose syndrome. Studies conducted among children with recurrent seizures and CNS disorders showed a reduction in the number of seizures in almost 50% of cases, and complete remission was achieved in 13 children. The researchers examined a total of 206 children (Sondhi et al., 2020; Figueroa et al., 2026). Compliance with dietary recommendations is key to improving the health of patients with drug-resistant epilepsy. Many scientific studies have shown that the KD diet has a better effect on patients with generalised seizures than on patients with idiopathic partial and generalised seizures (Verotti et al., 2020). The brain's energy source is glucose, which enters the CNS via the type 1 glucose transporter, known as GLUT1. GLUT1 is expressed, among other places, in the blood-brain barrier. In childhood, GLUT1 deficiency causes epilepsy. In the first months after birth, a severe form of the disease appears, which in many cases does not respond to pharmacological treatment after several months, and seizures, psychomotor disorders, spasticity, ataxia and involuntary movements appear (Klepper, 2025). Further studies on the effectiveness of the KD diet were conducted in the years 2012 to 2014. Eighty-five patients were enrolled in the study, 18 of whom had GLUT1 deficiency. The KD diet implemented in the treatment resulted in no seizures in the GLUT1-deficient patients (Klepper et al., 2005). Klepper and colleagues conducted other studies on the use of the KD diet in children with GLUT1 deficiency. The study group included 15 children who were placed on the KD diet for two years and six months, without pharmacotherapy. During the study, ten children did not experience any seizures. Two children experienced absence seizures despite the KD diet. Therefore, after seizure remission, the anti-convulsant ethosuximide had to be introduced into the treatment (Klepper et al., 2005). The aforementioned studies have demonstrated clearly that the KD diet is an effective therapeutic component in children with GLUT1 transporter deficiency. Another important condition is infantile encephalopathy, known as Dravet syndrome. In addition to seizures, this condition also presents with movement disorders, intellectual delay and elevated body temperature. In Dravet syndrome, anti-epileptic drugs are ineffective. It is worth noting that sodium channel blockers can exacerbate seizures. In 2015, Dressler and colleagues assessed the effects of the KD diet in children with confirmed Dravet syndrome. The study included 32 children: 19 boys and 13 girls. Ten children were treated exclusively with the KD diet. A complete response to the KD diet was observed in 70% of patients after three months of treatment, and in 60% of patients after 12 months of treatment. None of the ten children experienced complications. The frequency of prolonged generalised and myoclonic seizures also decreased.

No serious side effects were observed after the introduction of foods other than those included in the KD diet. The KD diet had therapeutic results similar to those observed in children treated with valproic acid or clobazam (Haridas et al., 2025). Drug-resistant epilepsy is a characteristic feature of tuberous sclerosis, which affects the kidneys, heart, skin, lungs, CNS and eyes. It is a genetic disorder caused by mutations in the TSC1 and TSC2 genes. Seizures occur in 90% of infants diagnosed with tuberous sclerosis. Seizures can be myoclonic, tonic or atonic, tonic-clonic, and can be simple or complex focal seizures. The key element of treatment is surgery to eliminate tumors and stimulate the vagus nerve. A new approach is the introduction of a KD diet in the postoperative period, where numerous studies have reported that the KD diet reduces the number of seizures. A study by Park and colleagues demonstrated that after three months of KT diet use in 12 children, the number of seizures decreased in six of them, and cognitive function and behaviour improved in seven. The study covered the period 2008 to 2015 (Youn et al., 2020). Similar studies were also conducted by Youn and colleagues. They examined 31 pediatric patients, and in 21 the number of seizures decreased within three months of implementing the KT diet. In 13 children, seizures were seizure-free for three months, but they recurred in ten patients over a two-year period (Youn et al., 2020). Childhood epileptic encephalopathy also occurs in Lennox-Gastaut syndrome. The disease affects children from three to ten years of age. In adulthood, this syndrome is referred to as West syndrome. The positive aspects of using a KD diet in this condition were presented by Lemon et al. The researchers conducted a study on a group of 71 children. They showed that six months after implementing the KD diet in 36 patients, the number of seizures decreased by half, and 16 patients experienced a 90% improvement (Skrobas et al., 2022).

It should be noted that the KD diet is, in most cases, a complementary treatment to pharmacological treatment (Borowicz-Reutt et al., 2024). Implementing the KD diet at home requires monitoring the child's condition for periods of one, three, six, 12, 18 and 24 months. This procedure serves to control potential seizure and metabolic complications caused by the KD diet. The main complications associated with the KD diet include gastrointestinal disorders, such as diarrhoea, constipation, nausea and vomiting. Other possible complications include dyslipidemia, osteopenia, kidney stones and infectious diseases (Sondhi et al., 2020). In conclusion, the KD diet in the treatment of epilepsy in children is gaining increasing interest in the medical and dietary communities. It is an important element of epilepsy treatment, especially in those not responding to pharmacotherapy.

The KD diet, implemented in children with epilepsy in the early stages, is conducted in centres specialising in this field, as it requires supervision by physicians and pharmacists. Next, the child's parents are educated about the KD diet, as collaboration between specialists and parents yields the best therapeutic results. Both parents and children should be involved in the entire therapeutic process, adhering to dietary recommendations.

2. Results and discussion of the study

The study involved 62 parents of children with epilepsy. The vast majority of respondents were women (85.48%; $n = 53$), while men accounted for 14.52% ($n = 9$). The majority of participants, 77.42% ($n = 48$), had no prior experience of a child suffering from epilepsy. Among the respondents' children, epilepsy was most frequently diagnosed between the ages of zero to three years (38.71%, $n = 24$), followed by the four to eight age group (27.42%, $n = 17$), above 13 years of age (22.58%, $n = 14$), and nine to 12 years (11.29%, $n = 7$). The largest group of respondents (32.26%, $n = 20$) considered that a properly selected diet does play a role in the treatment of epilepsy. Definite certainty regarding its importance was expressed by 27.42% ($n = 17$) of participants. Meanwhile, 33.87% ($n = 21$) were unable to assess this unequivocally, and 6.45% ($n = 4$) expressed doubts.

The principles of the ketogenic diet in the treatment of epilepsy were known to 59.68% ($n = 37$) of respondents, while 40.32% ($n = 25$) admitted they were not familiar with them. The ketogenic diet was used for the child by 75.81% ($n = 47$) of respondents. The largest number of respondents had been following the ketogenic diet for one month (43.55%, $n = 27$). A duration of therapy exceeding three months was declared

by 33.87% (*n* = 21), and a period of two months by 16.13% (*n* = 10). The shortest duration, three months, was reported by 6.45% (*n* = 4). The desire to check whether the diet would reduce the number of epileptic seizures was the most frequently cited reason for its introduction (54.84%, *n* = 34). Meanwhile, 24.19% (*n* = 15) of respondents implemented the diet due to drug-resistant epilepsy (Table 1).

Table 1. Characteristics of the study group (*n* = 62)

	***n* (%)**
Sex	
Female	53 (85.48%)
Male	9 (14.52%)
Previous contact with a child with epilepsy	
Yes	14 (22.58%)
No	48 (77.42%)
Most frequently reported age of child's diagnosis	
Between 0–3	24 (38.71%)
4–8	17 (27.42%)
Does diet play a role in the child's treatment?	
Yes	20 (32.26%)
No	42 (67.74%)
Knowledge of ketogenic diet principles	
Yes	37 (59.68%)
No	25 (40.32%)
Most frequently reported duration of ketogenic diet use in the child	
1 month	27 (43.55%)
More than 3 months	21 (33.87%)
Reason for implementing the diet	
Reduction of seizure frequency	34 (54.84%)
Drug-resistant epilepsy	15 (24.19%)
Was the diet effective?	
Yes	13 (20.97%)
Not necessarily	49 (79.03%)
After how long did the diet prove effective?	
After 3 months	37 (59.68%)
Most frequently reported improvements concerned	
Reduction of seizure frequency	26 (41.94%)
Improvement in quality of life	21 (33.87%)
Most frequently reported side effects	
Significant weight loss	20 (32.26%)
Drowsiness	19 (30.65%)
Can the diet be a form of treatment?	
Yes	45 (72.58%)
No	17 (27.41%)

Source: The authors.

Only 20.97% (n = 13) of respondents indicated clearly that the diet produces the expected therapeutic effects. A further 27.42% (n = 17) considered that it may do, while the largest group (37.10%; n = 23) were uncertain about the effectiveness of the therapy. Only 1.61% (n = 1) selected the answer 'definitely not'. An improvement in health was most frequently noticeable after three months of following the diet, as was indicated by 59.68% (n = 37) of respondents. In 27.42% (n = 17) of cases, improvement occurred after six months, and in 12.90% (n = 8) only after one year. Among the positive therapeutic effects observed, the most prevalent were: a reduction in the number of epileptic seizures (41.94%, n = 26), an improvement in the child's wellbeing (33.87%, n = 21), better sleep (33.87%, n = 21), and improved quality of life (32.26%, n = 20). At the same time, 19.35% (n = 12) of respondents observed no improvement whatsoever. The side effects of the diet most frequently reported by parents were: significant weight loss (32.26%, n = 20), drowsiness (30.65%, n = 19) and hypoglycaemia (25.81%, n = 16). For 33.87% (n = 21) of respondents, the ketogenic diet is regarded definitively as a form of treatment. An additional 37.10% (n = 23) described it 'rather' as a form of treatment. Only 9.68% (n = 6) expressed the opposite view, and 17.74% (n = 11) had no formed opinion on the matter.

2.1. Verification of the research hypotheses

The relationship between the age of the child at the time of the diagnosis of epilepsy and parental knowledge of the principles of the ketogenic diet was examined. The analysis revealed a statistically significant relationship between the age of the child at the time of diagnosis and the level of parental knowledge regarding the ketogenic diet ($\chi^2 = 10.13$; $df = 3$; $p = 0.017$). In the group in which the diagnosis was made between the ages of zero and three years, as many as 51.35% (n = 19) of respondents declared a familiarity with the principles of this diet (Table 2).

Table 2. Knowledge of the principles of the ketogenic diet and the age of the child at the time of epilepsy diagnosis (n = 62)

When was epilepsy diagnosed in your child?	Knowledge of the principles of the ketogenic diet in the treatment of epilepsy		TOTAL *n* (%)
	YES *n* (%)	NO *n* (%)	
Aged 0–3 years	19 (51.35%)	5 (20.00%)	24 (38.70%)
Aged 9–12 years	1 (2.70%)	6 (24.00%)	7 (11.29%)
Aged 4–8 years	9 (24.32%)	8 (32.00%)	17 (27.41%)
Above 13 years of age	8 (21.62%)	6 (24.00%)	14 (22.58%)
TOTAL	37 (100%)	25 (100%)	62 (100%)
$\chi^2 = 10.13$, $df = 3$, $p = 0.017$			

Source: The authors.

In comparison, only 2.70% (n = 1) of those familiar with the diet were parents of children diagnosed between the ages of nine and 12 years. In the remaining age groups, affirmative responses were distributed evenly: 24.32% (n = 9) in the four to eight years group, and 21.62% (n = 8) in the above 13 years group. In summary, approximately 60% of respondents declared a familiarity with the main principles of the ketogenic diet. A statistically significant relationship was found only in relation to the age of the child at the time of the diagnosis of epilepsy, suggesting that the level of parental knowledge increases with an earlier diagnosis of the disease.

The consistency between respondents' beliefs regarding the importance of the diet in the treatment of epilepsy and their perception of the ketogenic diet as a form of treatment was subsequently assessed. Among

those who considered that a properly selected diet has a therapeutic significance, as many as 83.78% (n = 31) indicated that they regard the ketogenic diet as a method of treatment. In the group who were undecided about the importance of diet, 57.14% (n = 12) also perceived it as a form of therapy, whereas among those who denied the significance of diet, only 25.00% (n = 1) considered the ketogenic diet to be therapeutic. The analysis revealed a statistically significant relationship between these beliefs (χ^2 = 11.74; df = 4; p = 0.019) (Table 3).

Table 3. The perception of the ketogenic diet as a form of treatment and beliefs about the importance of diet in epilepsy therapy (n = 62)

Do you regard the ketogenic diet as a type of treatment rather than a diet?	**Do you believe that a properly selected diet plays a role in the treatment of epilepsy?**			**Total** ***n*** **(%)**
	Definitely yes / Rather yes ***n*** **(%)**	**I don't know** ***n*** **(%)**	**Definitely no / Rather no** ***n*** **(%)**	
Definitely yes / Rather yes	31 (83.78%)	12 (57.14%)	1 (25.00%)	44 (70.96%)
Definitely no / Rather no	4 (10.81%)	2 (9.52%)	1 (25.00%)	7 (11.29%)
I don't know	2 (5.41%)	7 (33.33%)	2 (50.00%)	11 (17.74%)
TOTAL	37 (100%)	21 (100%)	4 (100%)	62 (100%)
χ^2 = 11.74; df = 4; p = 0.019				

Source: The authors.

The results of the analysis confirm that respondents are aware that the ketogenic diet constitutes a form of treatment of epilepsy. The statistically significant relationship between the belief in the importance of diet and its perception as a therapeutic method indicates that the majority of respondents correctly identify the ketogenic diet not as a general dietary approach, but as a targeted therapeutic intervention.

In the subsequent part of the analysis, the respondents' level of knowledge regarding the contraindications to the use of the ketogenic diet in the treatment of epilepsy was assessed. The responses to questions concerning a declared familiarity with contraindications and the conditions and clinical states identified by the respondents as precluding the use of this form of therapy were analysed. A declared familiarity with the contraindications to the ketogenic diet was indicated by just under 40% of respondents (Table 4).

Table 4. The distribution of the number of correct answers regarding contraindications to the use of the ketogenic diet (n = 61)

Number of correct answers	***n***	**% (100% = 61)**
0	24	38.71%
1	13	20.97%
2	10	16.13%
3	6	9.68%
4	2	3.23%
5	3	4.84%
6	2	3.23%
8	2	3.23%

Source: The authors.

In order to objectively assess the actual level of knowledge, the responses provided in the open-ended question, in which participants were asked to identify specific contraindications, were analysed. The largest group of respondents (38.71%) did not identify any correct contraindication. Only 4.84% of participants provided five correct answers, while 3.23% each were able to identify four, six, or as many as eight contraindications.

A correlation analysis was conducted between the respondents' level of education and the number of correct answers regarding contraindications to the use of the ketogenic diet. A positive and statistically significant association was obtained (*rho* = 0.29; $p < 0.001$), indicating that individuals with a higher level of education demonstrated greater knowledge in this area (Table 5).

Table 5. The relationship between the level of education and the number of correct answers regarding contraindications to the use of the ketogenic diet ($n = 61$)

Number of correct answers	Spearman's rank correlation coefficient (rho)	Probability level (p)
Level of education	0.29	<0.001

Source: The authors.

With regard to the issue of specialist supervision of the ketogenic diet, a total of 56.45% of respondents ($n = 35$) declared that their child's diet is conducted under the supervision of a physician. The same percentage of respondents (56.45%, $n = 35$) confirmed the supervision of a clinical dietitian. In both cases, the remaining participants were either uncertain or indicated the absence of such supervision.

The respondents are therefore aware of the necessity of specialist supervision of the ketogenic diet, although a group of parents are also visible whose answers may indicate insufficient knowledge or uncertainty in this regard (Table 6).

Table 6. Declared physician and dietitian supervision of the ketogenic diet used in the child ($n = 62$)

	n	%
Is the ketogenic diet your child follows supervised by a physician?		
Definitely yes / Rather yes	35	56.45%
I don't know / Rather no / Definitely no	27	43.55%
Is the ketogenic diet your child follows supervised by a clinical dietitian?		
Definitely yes / Rather yes	35	56.45%
I don't know / Rather no / Definitely no	27	43.55%

Source: The authors.

The primary aim of this study was to assess the level of knowledge of parents of children with epilepsy regarding the ketogenic diet as a form of treatment. The analysis of the empirical data obtained allowed the stated aim to be achieved. The study demonstrated that although a significant proportion of respondents declared familiarity with the main principles of the diet, the actual level of knowledge was varied, and in certain areas limited. This applied in particular to a knowledge of the contraindications to its use, and an awareness of the necessity to collaborate with a physician and a clinical dietitian.

The results obtained are consistent with the findings of Baghdadi et al. (2023), who demonstrated that a higher level of parental education in children with epilepsy correlates with better outcomes of the ketogenic

diet, particularly with a reduction in the frequency of epileptic seizures. These authors emphasised that parents with higher education (e.g. a bachelor's degree) reported improvements in their child's health more frequently than parents with only secondary education, indicating the importance of cognitive and educational competencies in the effective implementation and monitoring of dietary treatment. The study also confirmed the existence of a relationship between the level of education and an actual knowledge of the contraindications to the ketogenic diet. It was observed that respondents with higher education identified contraindications more frequently and more accurately than individuals with a lower level of education. This result suggests that a body of medical knowledge and the ability to assimilate and interpret information of a specialist nature may significantly influence the level of health awareness among parents.

Additionally, in accordance with the findings of Karandienė et al. (2024), the level of knowledge and the ability to implement the ketogenic diet are also significantly influenced by socioeconomic factors. These authors indicated that financial difficulties and limited access to specialist sources of information may significantly hinder parents in implementing dietary recommendations, as well as in effectively monitoring the effects of the therapy. These problems are also frequently associated with a sense of social isolation, a lack of institutional support, and stress related to the reorganisation of daily life around the demands of the diet. In the context of the present study, this may partially explain the limitations observed in the knowledge of contraindications, and the uncertainty expressed by some respondents regarding the need for collaboration with specialists, such as the attending physician or clinical dietitian. These results highlight the importance not only of formal education, but also of living conditions in a broader sense, in shaping parental competencies in the application of nutritional therapy in epilepsy.

The available literature repeatedly emphasises that the primary source of parental knowledge about the ketogenic diet is specialist physicians, in particular paediatric neurologists. Orr et al. (2024) indicated that nearly half of parents of children with epilepsy first learn about the ketogenic diet from the neurologist treating their child. This stems from the fact that it is neurologists who have the greatest awareness of the therapeutic potential of this diet and are able to recommend it as an alternative to pharmacological treatment, especially in cases of drug-resistant epilepsy. The authors also emphasise that specialist physicians build parents' fundamental trust in this form of therapy, and initiate the educational process, which should subsequently be continued by other elements of the healthcare system.

The results of the study are consistent with the above observations. More than half of the respondents declared that their child's ketogenic diet was conducted under the supervision of a physician or a clinical dietitian. This demonstrates a relatively high level of awareness regarding the need for the monitoring of this form of therapy by appropriately trained specialists, while simultaneously revealing the potential for the further strengthening of systematic informational and educational support.

Karandienė et al. (2024) drew attention to the importance of collaboration in interdisciplinary teams, encompassing not only physicians, but also clinical dietitians, nurses, psychologists and social workers. In their view, it is precisely this integrated, comprehensive approach to parental education that increases the effectiveness of the ketogenic diet, and improves parental trust and engagement. The study also observed that declared dietetic supervision co-occurred with greater respondent knowledge of the principles of dietary management.

The results of the study correspond with the observations presented by Orr et al. (2024), who noted that the majority of parents of children with epilepsy are generally aware that the ketogenic diet constitutes a form of treatment, rather than merely an alternative dietary approach. However, this awareness is rarely accompanied by an in-depth knowledge of the mechanisms of action of the diet, the principles of its application, potential side effects, and contraindications. The authors emphasise that parents often rely on general beliefs or fragmentary information obtained from physicians or the internet, which may result in a superficial understanding of this complex nutritional intervention. The present study also observed that although a large proportion of respondents confirmed being familiar with the principles of the diet, considerably fewer demonstrated detailed knowledge, such as regarding contraindications, or the necessity of specialist monitoring of the therapy.

Convergent conclusions were also presented by other authors, who highlighted the need to provide parents with comprehensive theoretical and practical preparation prior to the implementation of the ketogenic diet (Dyńka et al., 2026; Pondel et al., 2020; Rejdak et al., 2022; Sondhi et al., 2020; Verrotti et al., 2020). In their view, an insufficient understanding of the diet may lead to dietary errors, reduced treatment effectiveness, and early discontinuation of the therapy. Chentouf (2020) adds that a key factor determining the therapeutic success of the ketogenic diet is the full engagement of parents in the entire treatment process, from the decision to initiate the therapy, through its implementation, to the regular monitoring of outcomes. This requires not only motivation, but also an adequate body of knowledge, which remains unevenly distributed among the respondents studied.

In summary, the results obtained partially confirm the research hypotheses. Respondents demonstrated a basic familiarity with the principles of the ketogenic diet and an awareness of its therapeutic function; however, their knowledge of contraindications and the need for specialist supervision varied. These results indicate the need to implement targeted educational interventions directed at parents of children with epilepsy, particularly with regard to the practical application of the ketogenic diet, and collaboration with medical personnel.

2.2. Methodological limitations of the study, and further recommendations

The study was a diagnostic study aimed at identifying the needs and assessing the knowledge of caregivers of pediatric patients with epilepsy regarding the use of the ketogenic diet. Its primary goals were to improve the quality of care provided by the dietary clinic, and to improve communication with patients and their caregivers regarding nutritional therapy. A custom-designed questionnaire was used in the study, which, while allowing for the tool to be tailored to the study's objectives, could limit the ability to compare results with other studies.

Due to the small and purposefully selected study group, this type of study has limited generalisability to the entire population of epilepsy patients, and only refers to a small group under the care of a single clinic. Therefore, it represents only a fragmentary picture of the complex care provided to epilepsy patients, and their caregivers' knowledge of possible therapeutic options, including nutritional interventions. Therefore, the authors acknowledge that the value of this type of research should be enhanced by: including a larger and more diverse group of participants from as many centres as possible specialising in the implementation of the ketogenic diet in pediatric patients with various etiologies of epilepsy; refining the survey questionnaire to increase its internal and external validity; and, if the specific nature of working with patients and their caregivers requires it, supplementing the study with in-depth interviews in selected cases. Therefore, this study provides only an outline of the issue of assessing parental knowledge about the use of the ketogenic diet in children with epilepsy.

Conclusions

The analysis of the empirical research conducted, together with the verification of the research hypotheses presented in the study, allow for the following conclusions to be drawn:

- Parents of children in whom epilepsy was diagnosed at an early age more frequently demonstrate a knowledge of the main principles of the ketogenic diet.
- The majority of respondents perceive the ketogenic diet as a form of treatment, indicating a correct understanding of its therapeutic nature.
- Knowledge of the contraindications to the use of the ketogenic diet is limited, and depends primarily on the respondents' level of education.
- More than half the respondents are aware of the necessity of implementing the ketogenic diet under the supervision of a physician and a clinical dietitian.
- The following practical conclusions were also drawn from the study:

- Close collaboration between the dietary clinic and the epileptic patient and/or their caregivers is essential from the moment of diagnosis.
- Patients and their caregivers should receive comprehensive information regarding available therapeutic methods, including nutritional ones, as well as their limitations, management difficulties and contraindications. This knowledge should also include ongoing contact with a specialist, and comprehensive answers to questions and concerns regarding the choice and course of therapy.
- Specially developed informational and educational materials intended for patients and their caregivers can be a useful supporting tool in working with patients and their caregivers.

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TĖVŲ ŽINIOS APIE KETOGENINĖS DIETOS TAIKYMĄ PEDIATRIJOS PACIENTAMS GYDANT EPILEPSIJĄ

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Santrauka

Epilepsija priklauso nervų sistemos ligų grupei. Dalis epilepsijos atvejų yra atsparūs farmakoterapijai. Vienas iš gydymo metodų yra ketogeninė dieta, kuriai būdingas mažas angliavandenių kiekis, vietoj jų didinant riebalų kiekį.

Siekta įvertinti epilepsija sergančių vaikų tėvų žinių apie ketogeninę dietą lygį. Autoriai norėjo sužinoti, ar respondentai susipažinę su pagrindiniais ketogeninės dietos principais, ar žino, kad ši dieta yra gydymo forma, kokios jos kontraindikacijos ir ar supranta, kad jų vaikų ketogeninė dieta turi būti taikoma prižiūrint gydytojui ir klinikiniam dietologui.

Tyrime, kuris vykdytas 2025 m. sausio–kovo mėnesiais, dalyvavo 62 epilepsija sergančių vaikų tėvai. Naudotas autorinis anketos klausimynas, kurį sudaro 24 uždarieji klausimai. Tyrimui atlikti gautas Bioetikos komisijos leidimas. Atliekant tyrimą surinktų duomenų analizė buvo atlikta „Statistica“ programa (versija 13.3). Kiekvienos analizės statistinio reikšmingumo lygis – $p < 0,05$.

Atlikta analizė atskleidė statistiškai reikšmingą vaiko amžiaus vykdant diagnozę ir tėvų žinių apie ketogeninę dietą lygio tarpusavio ryšį ($\chi^2 = 10,13$; $df = 3$; $p = 0,017$). Grupėje, kur diagnozė buvo nustatyta 0–3 metų amžiuje, net 51,35 % ($n = 19$) respondentų deklaravo, kad yra susipažinę su šios dietos principais, taigi, kad tėvų žinių lygis auga, ligą diagnozavus anksčiau. Buvo įvertintas respondentų įsitikinimų dėl dietos svarbos gydant epilepsiją atitikimas jų suvokimui apie ketogeninę dietą, kaip gydymo formą. Atlikta analizė parodė statistiškai reikšmingą šių įsitikinimų tarpusavio ryšį ($\chi^2 = 11,74$; $df = 4$; $p = 0,019$). Analizės rezultatai patvirtina, kad respondentai suvokia, jog ketogeninė dieta yra epilepsijos gydymo forma. Buvo atlikta respondentų išsilavinimo lygio ir teisingo atsakymų į klausimus dėl ketogeninės dietos kontraindikacijų skaičiaus koreliacijos analizė. Gautas teigiamas ir statistiškai reikšmingas ryšys ($rho = 0,29$; $p < 0,001$), o tai rodo, kad aukštesnį išsilavinimą turintys asmenys turėjo daugiau šios srities žinių. Iš viso 56,45 % tiriamųjų ($n = 35$) deklaravo, kad jų vaiko dieta vykdoma prižiūrint gydytojui. Toks pat respondentų procentas (56,45 %, $n = 35$) patvirtino klinikinio dietologo priežiūrą. Be to, pastebėta tėvų grupė, kurių atsakymai rodo žinių, kad jų vaiko dieta turėtų būti kontroliuojama specialisto, nepakankamumą arba abejones šiuo klausimu.

Taigi vaikų, kuriems epilepsija diagnozuota ankstyvajame amžiuje, tėvai dažniau žino pagrindinius ketogeninės dietos principus. Dauguma respondentų suvokia, kad tai yra gydymo forma, taigi rodo teisingą jos terapinio pobūdžio supratimą. Žinios apie ketogeninės dietos kontraindikacijas yra ribotos ir daugiausia priklauso nuo tiriamųjų išsilavinimo. Daugiau nei pusė respondentų suvokia ketogeninės dietos būtinybę prižiūrint gydytojui ir klinikiniam dietologui.

RAKTINIAI ŽODŽIAI: *ketogeninė dieta*, *epilepsija*, *vaikai*, *tėvai*.

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