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ORGANIC FOOD FROM THE PERSPECTIVE OF PARENTS OF CHILDREN WITH AUTISM SPECTRUM DISORDERS

Katarzyna TARNOWSKA✉[1], Renata WINKLER[2], Eliza GRUCZYŃSKA-SĘKOWSKA[1], Dorota KOWALSKA[1], Ewa MAJEWSKA[1]

[1] Warsaw University of Life Sciences – SGGW, Poland
[2] Cracow University of Economics, Poland

Abstract: The number of children diagnosed with autism spectrum disorder (ASD) is increasing worldwide. Children with ASD often have impaired detoxification capacity, gastrointestinal problems and food intolerances. A well-balanced diet based on organic foods can play a significant role in alleviating both metabolic and psychological symptoms. The aim of this study was to explore the opinions and attitudes of parents of children with ASD towards organic foods. The study was conducted between June 2021 and May 2022 using a survey method, among 96 respondents. Those who were more knowledgeable about proper nutrition (19% of respondents) and those who used special diets for their children (45%) were more likely than the other respondents to believe that organic foods could improve the functioning of children with ASD. These parents were also characterised by better knowledge of organic food (definition, labelling). The most important factors when choosing organic food were health considerations, chemical content and simple product composition. The main source of information about organic food was the Internet (88%) and the most common place to buy was a specialist shop (43%). Parents who purchased organic food most frequently chose vegetables and fruit (69%) and eggs (65%). The main reasons respondents gave for not purchasing organic food were the high price and a lack of trust towards producers and certification bodies. In light of the collected data, it seems justified to take actions aimed at raising parents' knowledge of proper diet and nutrition, which could result in increased consumer awareness of organic food.

Key words: organic food, autism, diets, nutrition, knowledge, consumer preferences

INTRODUCTION

The number of children diagnosed with autism spectrum disorder (ASD) is increasing worldwide [1]. The cause of these disorders has not yet been established. The etiology is believed to be multifactorial, involving genetic predisposition, environmental factors, as well as factors related to immune system response and gastrointestinal function [2]. Children with ASD have impaired detoxification capacity and are particularly

✉ Katarzyna Tarnowska – Institute of Food Sciences, Department of Chemistry, 02-787 Warszawa, 159C Nowoursynowska St.; e-mail: katarzyna_tarnowska@sggw.edu.pl; https://orcid.org/0000-0002-8459-9019

Renata Winkler – College of Management and Quality Sciences, Management Institute, Department of Organizational Behaviour, 31-510 Kraków, 27 Rakowiecka St.; e-mail:renata.winkler@uek.krakow.pl; https://orcid.org/0000-0002-4697-9264

Eliza Gruczyńska-Sękowska – Institute of Food Sciences, Department of Chemistry, 02-787 Warszawa, 159C Nowoursynowska St.; e-mail: eliza_gruczynska@sggw.edu.pl; https://orcid.org/0000-0003-3309-9425

Dorota Kowalska – Institute of Food Sciences, Department of Chemistry, 02-787 Warszawa, 159C Nowoursynowska St.; e-mail:dorota_kowalska@sggw.edu.pl; https://orcid.org/0000-0002-3680-636X

Ewa Majewska – Institute of Food Sciences, Department of Chemistry, 02-787 Warszawa, 159C Nowoursynowska St.; e-mail:ewa_majewska@sggw.edu.pl; https://orcid.org/0000-0002-5910-1119

vulnerable to chemical contaminants from the environment, food, water and air. Correlations have been observed between the severity of autistic symptoms and the presence of heavy metals in the bodies of children with autism, as well as glutathione deficiency, which hinders detoxification processes [3–5]. A diet based on raw and organic products should be recommended for this group of patients. Organic food of plant origin is usually less frequently contaminated with pesticide residues when compared to the conventionally cultivated crops. Controls conducted in the European Union in 2018 showed that 44.5% of conventional food samples contained residues of one or more pesticides, and 1.2% of samples exceeded the maximum pesticide residue limits for more than 100 pesticides. In the case of organic products, 6.5% of the samples analysed contained residues of one or more pesticides, and only 3 samples (0.2%) exceeded the maximum residue limits for 3 pesticides [6].

Children with ASD are more likely than their neurotypical peers to experience gastrointestinal problems and abnormal eating behaviours. Sensory disorders, as well as the use of elimination diets, can contribute to a poorer diet, leading to insufficient intake of nutrients and their deficiencies [7]. Many studies indicate that children with ASD consume less than the recommended daily intake of calcium, iron, zinc, and vitamins A, E, K, D, C, B_6, B_{12}, and folic acid [8,9]. The intake of vitamins and compounds with antioxidant properties may be important due to coexisting metabolic disorders in children with ASD, including elevated blood levels of oxidative stress markers, which can affect the functioning of the central nervous system [10]. Numerous studies comparing the content of minerals and biologically active substances in plants from organic versus conventional farming indicate that organic food contains higher levels of certain nutrients, such as iron, magnesium, phosphorus, potassium, calcium, vitamin C, and polyphenols [11–13]. A diet enriched with calcium is particularly important for children with autism on a dairy-free diet, as this group has been observed to have lower bone mineral density and lower blood vitamin D levels than neurotypical children of the same age [14]. Milk produced in the organic system, compared to milk from conventionally raised cows, has a higher nutritional value: it contains more dry matter, fat, calcium, as well as vitamin C and α-tocopherols [13].

Children with autism are at risk of deficiencies in n-3 polyunsaturated fatty acids, which may lead to developmental disorders of the central nervous system, contributing to dyslexia, dyspraxia, hyperactivity, and reduced concentration. Studies on the effects of omega-3 supplementation indicate overall health improvements in children with ASD, including better sleep patterns, enhanced cognitive and motor skills, improved concentration, eye contact, social behaviours, as well as a reduction in stereotypies, anxiety, aggression, and hyperactivity [15]. Consuming organic food could potentially help improve these areas of functioning in this group of children. Organic milk and dairy products contain more health-promoting omega-3 unsaturated fatty acids and a better ratio of these acids to omega-6. Similarly, organic meat products, compared to conventionally raised meat, contain higher concentrations of polyunsaturated fatty acids (PUFAs), especially n-3 PUFAs [16, 17].

The results obtained so far indicate that children with ASD are more at risk of obesity than their healthy peers, and that the prevalence of overweight and obesity is higher in children with autism [18]. Human studies suggest that regular and frequent consumption of organic food may help reduce the incidence of conditions such as overweight and obesity, as well as allergic and cancerous diseases [13]. A well-balanced diet based on nutrient-rich, contaminant-free food can play a significant role in treating and alleviating digestive-metabolic and psychological symptoms in children with ASD.

Parents of children with autism are often actively engaged in seeking knowledge about a healthy lifestyle and alternative methods to support their children's development. The organic food market can be a place for them to fulfil their pro-health and pro-environmental values. Understanding their motivations will help tailor marketing and educational efforts to the specific needs of this group of consumers.

The aim of the study was to explore the opinions and knowledge of parents of children with autism spectrum disorders (ASD) regarding organic food. The study also examined their consumer preferences concerning the purchase and consumption of organic food products.

MATERIALS AND METHODS

The study was conducted between June 2021 and May 2022. It received approval from the Ethics Committee for Scientific Research Involving Humans at the Institute of Human Nutrition Sciences, Warsaw University of Life Sciences (SGGW), under Resolution No. 20/2021. The CAWI survey method was used with a custom questionnaire consisting of 32 questions concerning, among others things, the general characteristics of the respondents, the use of an elimination diet for their child/children with ASD, knowledge and opinions

about organic food, as well as the motives, frequency, and places of purchasing organic products. The question regarding respondents' nutritional knowledge included elements from the KomPAN questionnaire for assessing dietary beliefs and habits [19]. The questionnaire included single- and multiple-choice closed questions, closed questions with an open-response option, and open-ended questions. To assess respondents' opinions on the factors influencing their decisions to purchase organic food, a 5-point Likert scale was used, where 5 indicated 'very important' and 1 'not important'. Respondents also had the option to choose 'no opinion'. The study targeted parents of underage children diagnosed with autism spectrum disorders (ASD) living in Poland. The sample was selected using the snowball method and voluntary sampling. The invitation to participate in the study was shared via email, social media, and online platforms focused on parents of children with ASD.

In the analysis of the results, the percentage share of individual responses was presented, and to determine the statistical significance of the relationship between the variables, Pearson's correlation coefficient was calculated using the STATISTICA program.

A total of 96 respondents participated in the study (Table 1), of which more than 87% were women. The majority were between the ages of 30 and 50 (91%). Responses were collected from residents of all Polish provinces, but the largest groups were from the Mazowieckie province (38.5% of respondents) and the Małopolskie province (27.1%). 69% of respondents lived in large or medium-sized cities, while over 18% lived in rural areas. The largest group of respondents had a university degree (80.2% of those surveyed). The highest percentage of respondents (about 20%) reported an average monthly income per household member in the range of PLN 1001–2500, while the lowest percentage (about 3%) declared an income of PLN 1000 or less. More than 36% of respondents did not wish to disclose income information. Considering the subjective assessment of material conditions, over half of the 96 respondents stated that they were very satisfied or satisfied (8.3% and 44.8%, respectively) with their financial situation. About one-third (34.4%) gave a neutral response, saying they were neither satisfied nor dissatisfied, while 12.5% expressed dissatisfaction with their financial situation. None of the respondents described their financial situation as 'very dissatisfied'.

According to previous studies [20–23], this type of consumer should be interested in organic food. This type of food is primarily purchased by residents of large cities who are high-school or university educated and consider their financial situation good.

Table 1. Participant characteristics

Socio-economic characteristic		**Number of respondents (n = 96)**	**%**
Gender	women	83	87.4
	men	13	12.6
Age (years)	18–30	1	1
	31–40	56	58.3
	41–50	35	36.5
	above 50	4	4.2
Place of residence	village	18	18.8
	town up to 40,000 inhabitants	11	11.5
	city up to 100,000 inhabitants	12	12.5
	city over 100,000 inhabitants	55	57.3
Education	primary	1	1
	vocational	4	4.2
	high school	14	14.6
	university	77	80.2
Household net income (PLN) per person/month	1,000 or less	3	3.1
	1,001–2,500	20	20.8
	2,501–3,500	10	10.4
	3,501–5,000	13	13.5
	above 5,000	15	15.6
	no declaration	35	36.5

Source: own elaboration.

RESULTS AND DISCUSSION

It is assumed that individuals with a higher level of education possess greater knowledge about proper nutrition and are more inclined to purchase organic food. The questionnaire included a request for self-assessment of one's knowledge in the area of proper diet and nutrition. The largest group consisted of parents who rated their nutritional knowledge as sufficient (44 responses – 45.8% of respondents). Nearly one-third of the surveyed individuals believed that their nutritional knowledge was at a good level, while over 18% gave themselves a failing grade. Only 5% of parents rated their knowledge in this area as very good.

After analysing the respondents' answers to the questions concerning selected issues of proper nutrition, it was found that over 36% of the respondents rated their level of knowledge accurately, nearly 47% overestimated their knowledge, and just over 16% assessed their knowledge as being lower than the actual level. It should be emphasised that no significant correlation was found between self-assessed knowledge of proper diet and nutrition and the knowledge assessment assigned to respondents based on their answers to the questions in this area ($r = 0.125$).

Since, as mentioned, the cause of autism has not been diagnosed, standards of treatment for this group of patients have not yet been established. Parents of children with autism spectrum disorders (ASD), facing their children's developmental challenges, include various forms of therapy in their therapeutic efforts. Several studies have shown that younger children are more likely to receive dietary interventions (restrictive diets and dietary supplements) as well as educational and behavioural interventions. Pharmacological interventions are more widely used among adolescents [24]. The most commonly used dietary intervention is the gluten-free and casein-free diet (GFCF) [25]. The study found that some parents (43 individuals – 44.8% of the respondents) also made changes to their child's and family members' diets (Table 2). The most frequently implemented diets were gluten-free (GF), dairy-free (casein-free CF), and those restricting simple sugars and sucrose (sugar-free – SF).

Table 2. Types of elimination diets introduced by respondents in children with ASD

Type of diet	Children with ASD ($n = 43$)
elimination of allergens and intolerance	4
dairy-free (CF)	5
sugar-free (SF)	1
gluten-free (GF)	2
dairy-free (CF) + sugar-free (SF)	4
gluten-free (GF) + dairy-free (CF)	3
gluten-free (GF) + dairy-free (CF) + sugar-free (SF)	17
gluten-free (GF) + dairy-free (CF) + sugar-free (SF) + other: low FODMAP (3), soy- and starch-free (1)	4
vegetarian	2
ketogenic	1

Source: own elaboration.

It was assumed that individuals introducing an elimination diet in their families would seek to educate themselves on proper nutrition and thus have greater knowledge of organic food. Research conducted among Polish consumers [20, 26] indicated that factors such as interest in diets and proper nutrition influenced a greater openness to organic products. For this reason, the understanding of issues related to organic food (definition, labelling of organic products) was assessed, taking into account the respondents' level of knowledge about proper diet and nutrition, as well as their use of special diets (Table 3).

The study found that the majority of respondents (77 responses – 80.2%) recognised the correct definition of organic food. However, as many as 62.5% of respondents (multiple answers were allowed) indicated that organic food is 'food produced without synthetic fertilisers and pesticides'. This is an incorrect answer, even though it refers to production methods in organic farming. Most parents knew which terms on a product guaranteed that it came from organic farming. The most recognised label was EKO (65.6% of responses), while the least recognised was 'organic' (19.8% of selected responses). Some respondents confused the concept of organic food with healthy food (16.7% of responses) or preservative-free food (11.5% of responses). This may result from insufficient consumer knowledge and/or unfair practices of traders that misuse terms associated with organic food. Knech and Gurwin [21] also note the issue of inconsistency in the messages delivered to customers. The consequence of such actions is poor product identification and, subsequently, the inability to distinguish organic food from conventional food.

Table 3. Structure of respondents' answers based on their level of knowledge about proper nutrition and the use of a special diet for a child with ASD

Question	Structure of responses regarding knowledge and opinions about organic food [%]				
	assessment of the level of knowledge about proper nutrition			diet for a child with ASD	
	insufficient $n = 42$	adequate $n = 34$	good $n = 18$	yes $n = 43$	no $n = 53$
Definition of organic food*					
Any natural, unprocessed food	31	19.4	16.7	18.06	28.30
Food produced by organic farming methods	**66.7**	**86.1**	**94.4**	**86.05**	**75.47**
Any food bought directly from a farmer or at a market	7.1	0	5.5	4.65	3.77
Food produced without synthetic fertilisers and pesticides	47.6	72.2	66.7	67.44	58.49
Any food produced without the use of genetically modified organisms	23.8	22.2	5.5	13.95	26.42
Any food without preservatives and artificial additives	33.3	22.2	11.1	13.95	35.85
Labels for organic products*					
healthy food	14.3	22.2	11.1	11.63	20.75
BIO (biological)	**52.4**	**63.9**	**66.7**	**72.09**	**50.94**
straight from nature	4.8	2.8	5.6	2.33	5.66
country/farmhouse	2.4	0	0	0	1.89
EKO (ecological)	**54.8**	**61.1**	**88.9**	**67.44**	**60.38**
organic	**9.5**	**19.4**	**44.5**	**23.26**	**16.98**
natural	11.9	0	5.6	0	11.32
preservative-free	19.1	8.3	0	4.65	16.98
The organic farming symbol **					
	**73.8**	**83.3**	**72.2**	**76.74**	**79.25**
Do you believe that organic food can play a role in improving the health and well-being of a child with ASD?					
yes	66.67	55.56	77.78	79.07	45.28
no	16.67	25.0	16.67	16.28	22.64
It's hard to say, I have no opinion	14.28	13.88	5.56	4.65	32.08
Have you noticed a correlation between consuming organic food and improved well-being for you and your child/children?***					
yes	42.86	19.44	11.11	48.866	16.98
no	33.0	69.44	61.11	46.51	52.83
It's hard to say, I have no opinion	9.52	0	16.67	11.63	9.43

* The number of responses does not add up to 100% because respondents could choose more than one answer; ** Respondent could choose only one answer; *** The number of responses does not add up to 100% because not all respondents provided an answer.

Source: own elaboration.

The symbol established by the European Commission, known as the 'Euro-Leaf', which guarantees that a given product comes from a certified organic farm, was recognised by the overwhelming majority of respondents (78.1% of those surveyed). It is possible that its distinctive shape, which appears prominently on the product packaging, or its presence in media advertisements contributed to this recognition. In a study conducted in 2016 among consumers visiting the 'Zielony Targ' market in Poznań (Poland), the highest number of respondents recognised the 'Euro-Leaf' among organic labels [27].

In the survey conducted by Woś et al. [28], nearly 85% of mothers with young children living in the eastern regions of Poland were able to identify the organic food logo. However, the authors of the study emphasised that only the survey sheets from respondents who indicated the correct definition of organic food were included; therefore, the group of surveyed women had greater knowledge about organic food than the average woman in Poland, which may have been related to a higher-than-average interest in this type of food. Similarly, in a group of 89 mothers with preschool-age children, a significant portion of the participants had correct knowledge about organic food (97%) and its labelling (76%) [29]. Undoubtedly, the arrival of a child in the family increases concern about nutrition, and parents may navigate the food market more consciously. However, in the IMAS study (2017), which included 518 Polish respondents, the familiarity with the logo of the organic food production certificate was very low (33%) [22].

The study confirmed that better knowledge of proper nutrition issues influences consumer awareness regarding organic food. Similarly, making changes in the diet of family members (e.g., special diets, avoiding allergens) can encourage parents to gain a deeper understanding of the food market. The vast majority of respondents belonging to the aforementioned groups believed that organic food could have a beneficial impact on people's well-being and improve the functioning of children with autism spectrum disorders (ASD) (Table 3).

Responses to the question, 'Have you noticed a correlation between consuming organic food and improved well-being for you and your child/children?' varied. Parents whose children were on an elimination diet more often than other respondents perceived a connection between improved well-being and the inclusion of organic products in their diet. Many people felt that it was difficult to assess whether the improvement in their child's functioning was solely due to proper nutrition, as children with ASD undergo multifaceted therapy (psychological, educational, pharmacological, etc.). Some respondents indicated that such an assessment would be possible after a longer period of regular consumption of organic food; however, they did not have sufficient financial resources for this.

The economic situation and the price of products are among the most important factors influencing consumers' purchasing decisions. When asked how much higher a price the respondents were willing to pay for an organic product compared to the same non-organic one, the largest number of respondents answered that it was a maximum of 10–20% (Table 4). The structure of responses varied and did not depend on the household income of the respondents or their level of satisfaction with their financial situation. The individual views of parents regarding organic food likely influenced this. Confirmation of this can be seen in the distribution of statements such as 'I will buy an organic product regardless of the price', where the highest percentage of respondents providing such an answer were individuals with lower or medium incomes. This is justified by parents' concerns for their children's health and the desire to instil good eating habits in them. As can be seen, this is a strong motivation that partially offsets the significance of a family's weaker financial status.

In the study by Kułyk and Michałowska [30], involving a group of 302 randomly selected respondents from the Lubuskie province of Poland, 38% of those surveyed expressed no willingness to pay a higher price for organic food. In contrast, those who declared a willingness to pay a higher price (102) were ready to incur an expense higher by 5–10%. Only a small percentage of individuals (4%) were willing to accept a higher price in the range of an extra 41–45% [30]. Although fruits and vegetables are the best-selling organic food products in Poland, the overall acceptance of price increases for organic apples in the study by Kazimierczak et al. [31] was about 20% (89% of responses). Similarly, in the study by Hermaniuk, the price difference accepted by the largest number of respondents between organic and conventional food was 20% [32]. The willingness to pay a higher price for organic food varies between countries, for instance, consumers from Germany and the United Kingdom are willing to pay up to 50% more, while Italians are even willing to pay up to 100% more [30].

The price of food also did not have a significant impact on the purchasing decisions of the surveyed parents regarding the choice between a foreign product with an organic certificate and a domestic non-organic one (Table 4). The respondents' decisions were largely dependent on the type of product and its origin: a large percentage of respondents would choose food produced in Poland.

The authors indicated [26, 33] that for Polish consumers, the idea of organic food production is closely related to the concept of traditional food production and is associated with the desire to shorten the production and distribution chain. The place of sale, product origin, and the structure of the assortment are important. Similarly, in a study conducted in Spain, consumers valued regionally produced tomatoes the most, especially ribbed organic tomatoes, provided they were produced on a national scale, taking into account a short supply chain [34]. Other studies have shown that for some consumers, geographical proximity (localness) is more important than the organic production system [35, 36].

An attempt was made to investigate the significance of various factors influencing respondents' purchase of organic food (Table 5). A Likert scale was used for this purpose, where 5 indicated very important, 4 – important, 3 – minimally important, 2 – neither important nor not important, and 1 – not important. For all parents, regardless of their level of knowledge about proper nutrition or the use of elimination diets for their children, the most important factors considered when purchasing organic food were health concerns and the safety of such food, which respondents associated with a low content of chemicals. The respondents were interested in products with simple ingredients, low levels of processing, and the nutritional content of the food they purchased. The positive impact of organic food on health as a key motivation for purchasing organic products is confirmed in the literature. Numerous studies conducted among various groups of respondents indicate that health benefits are the most important rationale for purchasing organic food [27–29, 32, 33, 37–39].

Table 4. Structure of responses depending on the respondents' income [%]

Question	Answer	Average monthly net income of a household per person							Level of satisfaction with income				
		1000 PLN or less $n = 3$	1001–2500 PLN $n = 20$	2501–3500 PLN $n = 10$	3501–5000 PLN $n = 13$	>5000 PL*N* $n = 15$	no data $n = 35$	total $n = 96$	very satisfied $n = 8$	satisfied $n = 43$	neither satisfied nor dissatisfied $n = 33$	dissatisfied $n = 12$	total $n = 96$
If you had the choice between a domestic product without an organic production certificate and the same foreign organic product, which one would you buy?	domestic	66.7	40.0	50.0	15.4	53.3	34.3	38.5	50	37.2	33.3	50	38.5
	foreign organic	0	0	0	7.7	0	11.4	5.2	12.5	2.3	6.1	8.3	5.2
	depends on the type of product	33.3	45.0	40.0	46.1	40.0	40.0	41.7	37.5	44.2	45.4	33.3	41.7
	depends on the price difference between the two products	0	10.0	10.0	23.1	6.7	11.4	11.5	0	11.6	12.1	8.3	11.5
	cheaper	0	5.0	0	7.7	0	2.8	3.0	0	4.6	3.0	0	3.0
How much higher a net price are you willing to pay for an organic product compared to the same product without an organic production certificate?	10% more	33.3	30.0	20.0	7.7	40.0	25.7	25.0	12.5	30.2	18.2	33.3	25
	20% more	33.3	35.0	10.0	46.1	26.7	20.0	27.1	25	27.9	24.2	33.3	27.1
	30% more	0	5.0	30.0	15.4	6.7	11.4	11.5	12.5	14.0	12.1	0	11.5
	50% more	0	5.0	0	7.7	6.7	5.7	6.3	0	7.0	6.1	8.3	6.3
	100% more	0	0	0	0	6.7	0	1.0	12.5	0	0	0	1.0
	I will buy the organic product regardless of the price	0	15.0	20.0	7.7	13.3	20.0	15.6	25	14.0	18.2	8.3	15.6
	I will always buy the cheaper one	33.3	10.0	20.0	15.4	0	17.1	13.5	12.5	7.0	21.2	16.7	13.5

Source: own elaboration.

Table 5. Impact of the importance of factors on the purchase of organic food by respondents based on their level of knowledge about proper nutrition and the application of a special diet for children with ASD.

DISTINGUISHING FEATURE	Total (child on **a diet**) $n = 43$				*good* $n = 8$			*adequate* $n = 18$			*insufficient* $n = 17$		
	R	***M***	**Md**	***SD***	***M***	**Md**	***SD***	***M***	**Md**	***SD***	***M***	**Md**	***SD***
care for health	2	4.65	5	0.78	4.13	5	1.46	4.72	5	0.57	4.82	5	0.39
chemical content	1	4.88	5	0.33	4.86	5	0.38	4.89	5	0.32	4.88	5	0.34
safety	4	4.54	5	0.81	4.29	5	1.11	4.56	5	0.92	4.63	5	0.50
GMO-free	8	4.11	5	1.28	3.71	4	1.11	4.14	5	1.41	4.25	5	1.24
degree of processing	6	4.40	5	0.84	4.00	4	1.15	4.44	5	0.78	4.53	5	0.74
taste, smell, appearance	7	4.23	4	0.90	4.57	5	0.53	4.06	4	1.09	4.27	4	0.80
simple ingredients	3	4.59	5	0.77	4.43	5	0.98	4.50	5	0.86	4.75	5	0.58
nutrient content	5	4.49	5	0.72	4.43	5	0.79	4.41	5	0.87	4.60	5	0.51
environmental care	10	3.87	4	0.99	3.71	3	0.95	4.00	4	1.12	3.79	4	0.89
animal welfare	9	3.92	4	1.00	4.14	4	0.90	3.82	4	1.24	3.93	4	0.73
medical recommendations	11	3.82	4	1.30	3.29	4	1.25	3.83	4	1.34	4.07	4.5	1.27
fashion, trends	13	1.74	1	1.06	1.57	1	0.79	1.73	1	0.96	1.89	1	1.45
curiosity	12	2.12	2	1.22	2.50	2.5	1.52	2.07	2	1.10	2.00	1.5	1.28
DISTINGUISHING FEATURE	Total (child **not on a diet**) $n = 53$				*good* $n = 10$			*adequate* $n = 18$			*insufficient* $n = 25$		
	R	***M***	**Md**	***SD***	***M***	**Md**	***SD***	***M***	**Md**	***SD***	***M***	**Md**	***SD***
care for health	1	4.56	5	0.78	4.75	5	0.46	4.54	5	0.88	4.50	5	0.83
chemical content	2	4.55	5	0.80	4.88	5	0.35	4.36	5	0.93	4.55	5	0.83
safety	3	4.28	4	0.86	4.25	5	0.71	4.25	5	0.97	4.32	5	0.89
GMO-free	8	3.73	4	1.40	3.88	4	1.36	3.00	5	1.58	4.15	5	1.14
degree of processing	5	4.19	4	0.86	4.25	4	0.46	4.00	5	1.04	4.30	5	0.86
taste, smell, appearance	7	3.95	4	1.05	4.00	5	0.76	3.62	4	1.39	4.17	4	0.86
simple ingredients	4	4.27	5	0.96	4.63	5	0.52	4.39	5	0.74	4.05	5	1.19
nutrient content	6	4.14	4	0.98	4.25	5	0.71	3.79	5	0.97	4.35	5	1.04
environmental care	9	3.66	4	0.81	4.13	3	0.35	3.42	4	0.91	3.63	4	0.83
animal welfare	10	3.45	3.5	0.76	3.50	4	0.76	3.25	4	0.75	3.56	4	0.78
medical recommendations	11	3.40	4	1.15	2.75	4	1.16	3.15	4	1.21	3.84	4.5	0.96
fashion, trends	13	2.14	2	0.99	1.50	1	0.93	2.31	1	1.03	2.33	1	0.90
curiosity	12	2.53	3	0.88	1.88	2.5	0.83	2.62	2	0.96	2.80	1.5	0.68

M – average (mean); Md – median; SD – standard deviation; R – ranking

Source: own elaboration.

Concerns about the natural environment and animal welfare were of lesser importance to parents as motivations for making consumption decisions regarding organic products (median 3 or 4) (Table 5). A similar consumer profile emerges from research conducted by Hansen et al. [40]: egoistic motivations, such as concern for health, have a greater influence on the purchase of organic food than altruistic motivations focused on environmental values. According to Średnicka-Tober et al., social issues have a minimal impact on consumers' decisions regarding the purchase of organic food products [20].

Regarding the relationship between respondents' level of knowledge about proper diet and nutrition and the assessment of the importance of various factors influencing their purchasing decisions (such as concern for health, chemical content, safety, absence of GMOs, degree of processing, taste/smell/appearance, concern for the environment, concern for animal welfare, medical recommendations, fashion/trends, and curiosity), a weak but noticeable negative correlation was found between respondents' knowledge (both in terms of self-assessed knowledge: $r = –0.291$, and the score achieved by respondents in the knowledge test: $r = –0.278$) and the importance placed on medical recommendations. Conversely, a high level of correlation was found between the importance attributed to nutritional ingredients and the assessment of the significance of taste/smell/appearance ($r = 0.586$), concern for animal welfare and concern for the environment ($r = 0.726$), as well as curiosity and fashion ($r = 0.695$).

Parents participating in current study had the opportunity to indicate other factors that were important to them when purchasing organic food. Among the responses provided by the participants were comments regarding supporting producers of high-quality food, particularly local producers: 'I am happy if I can buy something of good quality locally'. Some parents raised issues of trust in the seller, the brand of the product, the organic certification, and also pointed to the necessity of using eco-friendly food packaging.

The organic food market has significant potential; however, there are many factors that prevent consumers from fully understanding the high value of organic food. A major influence on this phenomenon is the asymmetry of knowledge and information regarding production, certification, and the identification of such food. Table 6 presents the opinions of respondents on the aforementioned topics and the related reasons for not purchasing organic food.

Table 6. Barriers to purchasing organic food

If you do not purchase organic food or purchase it rarely, please indicate the reasons.	Number of responses %*
The price is too high	61
I don't believe that farmers and producers actually follow the principles of organic production completely	41
I don't trust the organisations that certify producers	23
I don't see a difference in the quality and taste of such food compared to conventional food	18
I have limited access to organic food	17
I don't understand why organic food is more expensive than conventional food	11
I cannot distinguish organic food from conventional food	6
I don't know where I can buy it	4
I am not interested in organic food	3

* The number of responses does not add up to 100% because the respondent could select more than one answer.

Source: own elaboration.

The main reason why respondents do not buy organic food or buy it infrequently is definitely the price. The price difference between organic and conventional products, in some cases reaching up to 200%, is one of the main obstacles to the popularisation of such products in Poland and worldwide [30–32,37,41]. In a study by Bryła involving 1,000 Polish consumers, both low-income and high-income respondents cited high prices as a barrier to purchasing organic food [38].

A large percentage of surveyed parents indicated a lack of trust in those responsible for the various stages of organic product production ('From farm to table'), including the certification process (Table 6). Issues with trust and a sceptical attitude towards control systems in organic farming are more noticeable in developing countries than in those with higher economic status. In a study involving respondents from Kosovo, certification was the factor most strongly influencing their attitudes towards organic food [39]. Acceptance of certification by consumers is crucial for building trust and consuming organic food products, as many attributes of food that consumers seek and are willing to pay a premium for are not visible. The identification and validation of such food products are possible only by reducing the information asymmetry between producers and consumers, which

can be achieved by ensuring certification by the appropriate certifying body. For consumers in Kosovo [39], an independent international certifying body was considered more credible than a national one.

More than 30% of parents do not appreciate the beneficial properties of organic food, which is likely due to insufficient knowledge about it (Table 6).

Respondents were asked about their sources of information regarding organic food, their purchasing locations, and shopping preferences (Table 7). The main source of knowledge for the surveyed parents is the Internet, followed by advice from doctors or dietitians. Interpersonal relationships also play an important role in providing information. The study indicates that respondents take into account the opinions of family and friends. This may be because they are more interested in learning about products recommended by trusted individuals. Other authors also highlight the dominant role of the Internet as a source of knowledge about organic food [29,33,43].

Table 7. Selected dietary behaviours of respondents related to organic food consumption (% of responses)

Analysis category	Verified Options	% of responses *
Explored sources of information about organic food	Internet	88.5
	doctor, dietitian	29.2
	family, friends	24.0
	television, radio programs	15.6
	advertising campaigns	12.5
	press	12.5
	food fairs	11.5
	sellers	4.2
Place of purchase for organic food	organic food store	42.7
	online store	38.5
	supermarket	36.5
	market, bazaar	30.2
	organic farm	21.9
	I do not purchase organic food	22.9
Selected groups of organic food products	fruits and vegetables	68.8
	eggs	64.6
	grain products (bread, groats, pasta, cereal)	44.8
	seeds, grains, nuts	35.4
	meat, meat products	34.4
	milk, dairy products or dairy alternatives	33.3
	fats	31.3
	spices	24.0
	fruit and vegetable preserves	21.9
	spreads and flavoured butters	18.8
	beverages and juices	15.6
	fish and fish products	14.6
	baby food	12.5
	confectionery	6.3

* The number of responses does not add up to 100% because the respondent could select more than one answer.

Source: own elaboration.

The surveyed parents make purchases of organic food in various places, most often in stores specialising in the sale of such products, but also in brick-and-mortar supermarkets and online stores. One-fifth of respondents chose direct contact with organic producers, and nearly one-third make purchases at markets. However, there is a question about whether food bought in such places (markets, bazaars) is truly organic, or whether respondents, due to a lack of sufficient knowledge, mistakenly identify the purchased products as organic.

Among organic food products, respondents most often include vegetables and fruits, eggs, and grain products in their shopping baskets (Table 7). The frequency of purchasing certain products such as meat and meat products, milk and dairy products, seeds and nuts, as well as edible fats is at a similar level (around 30%). These choices are not surprising, as these groups of products form the basis of a human diet. Moreover, certain organic products may be more or less available. Parents least frequently buy confectionery products, which is likely due to health concerns, or they may prepare such products at home. Other authors present similar purchasing preferences for organic products [20, 27, 29–32].

CONCLUSIONS AND FUTURE PERSPECTIVES

The aim of the study was to analyse the perception of organic food by parents of children with autism spectrum disorders. A higher level of awareness regarding the beneficial properties of organic food and the ability to identify it is noticeable among respondents with greater knowledge about proper nutrition and those following elimination diets compared to other parents. The most common reason for interest in organic products remains health-related concerns, while the main barrier to consuming organic food is its high price and lack of trust in organic food producers and the certification system. Environmental motivations are considered less important to consumers than health-related impulses, and the willingness to pay a higher price for organic products mainly depends on the type of product and its origin.

In light of the collected data, it seems reasonable to undertake actions aimed at raising parents' knowledge regarding proper nutrition and organic food production. When a child receives a diagnosis of an autism spectrum disorder, parents should receive extensive support and care. This support should include, among other things, guidance on the child's therapeutic activities, opportunities to strengthen parents in a new and challenging situation (e.g., where to seek psychological and psychiatric help or join parental support groups), and raising awareness – particularly crucial for children with autism – about the role of proper nutrition and food quality.

Initiatives to enhance knowledge about proper nutrition, diets, and the benefits of organic food should target the entire society, encompassing all age groups, from preschool to university students, as well as individuals who have already completed their education. Therefore, the government's decision to introduce a new subject – health education – in Polish schools starting in September 2025 is very timely. Students will learn about mental and physical health protection, proper nutrition, and sexual education, among other topics.

Additionally, marketing efforts should focus on clearly highlighting the distinguishing features of organic products compared to conventional ones, which would mitigate the perception of their high price. Furthermore, building proper communication and a trustful atmosphere between consumers and producers is essential.

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