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Patterns of Complementary and Alternative Medicine Use Among Children and Young Adults with Autism Spectrum Disorder

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ABSTRACT

Background: This study investigates the utilization of complementary and alternative medicine (CAM) practices, perceived benefits, and etiological beliefs among children and young adults with Autism Spectrum Disorder (ASD) and their families.

Methods: This exploratory cross-sectional study included 136 participants (mean age 8.9 years; 72.8% male). Data were collected using questionnaires completed by parents regarding CAM utilization patterns, etiological beliefs, and primary information sources. To identify the predictors associated with the lack of parents' perceived benefit from CAM methods, a logistic regression model was utilized among CAM users (n = 124), adjusting for selected clinical, sociodemographic, and informational variables.

Results: A high prevalence of CAM use was identified, with 91.2% of participants reporting the use of at least one method. The most common practices were prayer (62.5%), vitamin/mineral supplementation (51.5%), and dietary supplements (44.1%). CAM preferences appeared to vary across developmental stages. Furthermore, logistic regression analysis revealed that child age was the only significant predictor for parents reporting no perceived benefit from CAM; each one-year increase significantly decreased the odds of perceiving no benefit (OR = 0.838; 95% CI, 0.762–0.921; P = .001). Sociodemographic variables and primary information sources did not significantly predict this outcome.

Conclusions: CAM utilization is widespread and highly dynamic among families of children with ASD. The perceived lack of benefit is significantly associated with younger child age, likely reflecting unmet high expectations during the early post-diagnostic period. These findings highlight the psychosocial nature of CAM use and emphasize the crucial role of professionals in maintaining open dialogues to provide safe, cost-effective, and evidence-based guidance.

Keywords: autism spectrum disorder; complementary and alternative medicine; parents; perceived benefit.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by impairments in communication and social interaction, accompanied by restricted and repetitive patterns of behavior and/or interests, often associated with differences in sensory processing, and negatively affecting the individual's quality of life. Epidemiological data reveal that ASD has a prevalence of approximately 1% in childhood, and it is reported that this high incidence is associated with a significant economic burden for families and society.[1] It is well established that the etiology of ASD is multifactorial and has not yet been fully elucidated; however, contemporary studies demonstrate that the interaction between genetic predisposition and environmental factors plays a decisive role in the development of the disorder.[2]

An effective treatment approach targeting the core symptoms of ASD has not yet been developed. In accordance with current guidelines and evidence-based practices, first-line treatment options are predominantly represented by structured behavioral interventions.[3] Currently, there is no pharmacological treatment that directly targets the core

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symptoms of ASD; existing pharmacotherapy approaches focus primarily on managing behavioral symptoms and comorbid psychiatric disorders, as well as reducing the severity of core symptoms. Furthermore, it is reported that children with ASD exhibit a higher sensitivity to medications and their associated adverse effects compared to their neurotypical peers.[4,5]

Families of children diagnosed with ASD frequently experience anxiety regarding potential medication side effects and seek treatment options they perceive as safer; this situation has led to a significant increase in recent years in the interest in Complementary and Alternative Medicine (CAM) practices, which encompass various interventions that cannot be integrated into the conventional healthcare system.[6,7] The literature reports that numerous CAM applications, such as specialized diets, nutritional supplements, herbal products, probiotics, music and art therapies, massage, chelation, and hyperbaric oxygen therapy, are utilized in children diagnosed with ASD; however, current evidence remains limited in supporting the efficacy and safety of the majority of these methods.[8] Systematic reviews and meta-analyses indicate that the average prevalence of the use of any CAM method among children and adolescents diagnosed with ASD is approximately 54%, with lifetime prevalence rates reaching up to 92% in some studies.[9] In addition, epidemiological and sociocultural studies demonstrate that the use of CAM is closely associated with cultural context and societal belief systems.[10] In a survey study conducted in our country involving 38 parents, participants reported the five most frequently used CAM methods as vitamins and minerals, special diets, sensory integration, other dietary supplements, and chelation.[11] In addition, in another study conducted across five different geographical regions of Türkiye, 56% of the 172 participants reported using at least one CAM method, with spiritual healing and prayer identified as the most frequently utilized approach.[12] There are limited studies in our country examining the use of CAM among children and adolescents diagnosed with ASD.

MAIN POINTS

- CAM utilization is highly prevalent (91.2%), primarily involving prayer and nutritional supplements.
- Younger child age was associated with a higher probability of parents perceiving no benefit from CAM.
- Peer-to-peer communication among families serves as the primary information source for CAM practices.
- CAM preferences appeared to vary across developmental stages, with vitamin/mineral supplements and herbal products use increasing during adolescence.

This exploratory cross-sectional study aimed to examine the prevalence, patterns, and predictors of CAM use among children and young adults with ASD in a Turkish sample. The primary objective was to investigate the utilization and perceived benefits of CAM practices. Secondary objectives included exploring parental beliefs regarding the etiology of the disorder and the primary sources of information families relied upon. To achieve this, parents of children and adolescents with ASD were interviewed using a structured questionnaire to assess their perceptions regarding the etiology of ASD, the use of CAM methods, sources of information about CAM, monthly expenditure amounts, duration of use, and perceived benefits observed by the parents.

MATERIALS AND METHODS

Participants

The required sample size was determined using the Cochran formula for proportion estimation (95% confidence level, 10% margin of error, and an expected prevalence of 56%) based on a similar multicenter study conducted in Türkiye,[12] which reported a 56% prevalence of CAM use among children with ASD. To achieve a representative sample with sufficient statistical power, it was calculated that a minimum of 95 participants was required to ensure the reliability of the findings. The study sample consisted of parents of children and young adults aged 3 to 25 years diagnosed with ASD, who were admitted to the Ondokuz Mayıs University (OMU) Faculty of Medicine, Child and Adolescent Psychiatry Outpatient Clinic, and followed by the OMU Education Practice and Research Center. Diagnosis for all participants, including young adults, was confirmed based on DSM-5 clinical criteria by experienced child and adolescent psychiatrists. Young adults aged 18–25 years were included because they were followed longitudinally by the same developmental and child-adolescent psychiatry services and continued to receive ASD-related clinical or educational support. For participants aged 18–25 years, the capacity to provide autonomous informed consent was clinically assessed by the attending psychiatrist before enrollment. Inclusion criteria for the study were: (1) children and young adults aged 3 to 25 years, (2) having a confirmed diagnosis of ASD based on DSM-5 clinical criteria, and (3) being admitted to and followed by the Ondokuz Mayıs University Child and Adolescent Psychiatry Outpatient Clinic and Developmental Education Application and Research Center. Exclusion criteria included: (1) inability to reach the family or lack of response, (2) declining to participate in the study, (3) diagnosis of ASD not being confirmed via DSM-5 or medical records, (4) presence of a major co-existing genetic or medical condition, and (5) inability to complete the data collection process. Out of a total of 550 patients and families contacted via telephone and face-to-face, 414 were excluded and 136 agreed to participate in the study. The detailed recruitment and participant flow is presented

in Figure 1. Following the informed consent process obtained from the parents for minors and directly from adults capable of providing independent consent, a total of 136 participants completed the sociodemographic data form and the self-report questionnaire regarding the use of complementary and alternative medicine.

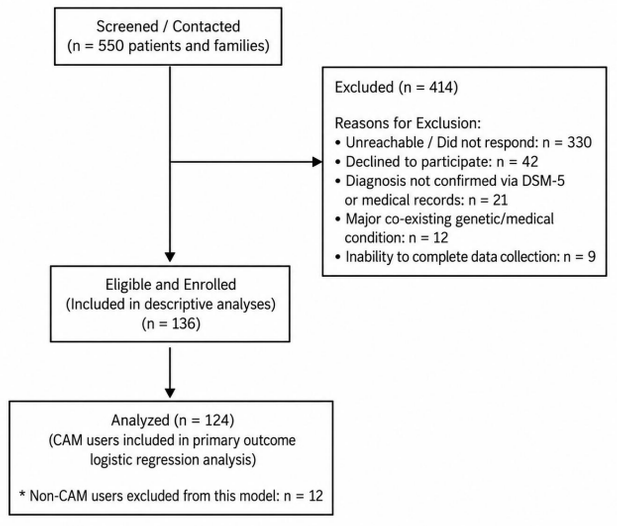

Figure 1. Flow diagram of recruitment and study participation. CAM, complementary and alternative medicine.

Instruments

In this section, the measurement tools used to obtain data from the participants are introduced, and detailed information regarding these forms and scales is provided below.

Sociodemographic Information Form

Through this form, developed by the researchers, information was collected regarding the age, sex, age at diagnosis, school attendance, grade level if attending, receipt of special education, trainings related to ASD, psychiatric medication use, and presence of siblings for children with ASD. Additionally, data on the number of household members, parents' age, occupations, education levels, and the number of rooms in the residence were recorded.

Self-Report Form on Complementary and Alternative Medicine Use

Before administering the survey, participants were provided with a standardized briefing regarding medical treatments and CAM methods to ensure consistent comprehension. The self-report questionnaire, developed by the researchers, consisted of three main sections comprising a total of 15 Likert-type and open-ended questions. To establish content validity, the comprehensive list of CAM methods and the survey items were developed and refined through expert consultation with a multidisciplinary panel, comprising an experienced child and adolescent psychiatrist, an experienced general psychiatrist, and an experienced special education professional. The survey took approximately 15 minutes to complete. The questionnaire evaluated participants' views on the etiology of ASD, the treatment methods they pursued after diagnosis (medical treatments and/or CAM methods), and the specific CAM methods used. Additionally, key information collected in the survey included sources of learning about CAM methods, duration of use, monthly expenditure, and observed benefits. Medical treatments included pharmacological therapies, special education programs for ASD, behavioral interventions, sensory integration therapies, and speech and language therapy, while CAM methods were presented in detail in the survey. The classification of prayer as a CAM modality was included in accordance with sociocultural contexts and traditional practices frequently reported in the literature, acknowledging its widespread use as a coping mechanism.

Statistical Analysis

Data analysis and manipulation were conducted using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were employed to summarize the sociodemographic characteristics of the sample, clinical features, and patterns of CAM use. Continuous variables were evaluated for normal distribution using the Kolmogorov-Smirnov test and presented as means with standard deviations (SD) or medians with ranges (minimum–maximum), as appropriate. Categorical variables were reported as frequencies (n) and percentages. To identify the predictors of parents' perceived benefits from CAM methods, binary logistic regression analysis was performed. The outcome variable was defined as 'perceived no benefit' among CAM users only. Participants who reported no CAM use were excluded from this regression model because perceived benefit could not be meaningfully assessed in non-users, resulting in an analysis sample of n = 124.

Research Ethics

Ethical approval for this study was granted by the Ondokuz Mayıs University Clinical Research Ethics Committee (Approval No: 2025/140, Date: April 21, 2025). The study was conducted in accordance with the principles of the Declaration of Helsinki. Prior to participation, written informed consent was obtained from all participants or their legal representatives. For minors (aged 3–17 years), consent was provided by their parents or legal guardians. In the case of young adults (aged 18–25 years), independent informed consent was obtained directly from the individuals, contingent upon their capacity to provide autonomous consent. All respondents were briefed using a standardized protocol regarding the study's purpose, the voluntary

nature of their involvement, and the measures taken to ensure data confidentiality.

RESULTS

Descriptive Data

In our study, data from 136 children and their families were examined. The majority of the children in the study group were male (72.8%), with a mean age of 8.96 ± 4.96 years. The data were predominantly completed by mothers (77.9%), and 90.4% of the parents were found to be married. Regarding educational level, high school graduation was the most common level among both mothers (41.2%) and fathers (33.8%). While 84.6% of the mothers were not employed, 43.4% of the fathers were employed as workers. The mean age of the parents was 38.24 ± 7.55 years for mothers and 41.33 ± 9.13 years for fathers. The households consisted of an average of 3.87 individuals, and the families had an average of two children (Table 1).

When the distribution of current educational interventions received by children with autism within the scope of the study was examined, it was observed that the vast majority of participants benefited from special education (76.5%, n = 104) and individualized education services (65.4%, n = 89). These were followed by speech and language therapy (46.3%) and occupational therapy (33.8%), respectively. Sensory integration therapy (14.7%) and play therapy (11.8%) were preferred at lower rates. On the other hand, it was determined that 5.1% (n = 7) of the children in the study group were not currently receiving any educational intervention (Table 2).

Data Related to Complementary and Alternative Medicine

The frequency of CAM method use among families within the scope of the study is presented in Table 3. It was determined that the vast majority of participants (91.2%) used at least one CAM method. The most frequently used methods were, respectively, prayer (62.5%), vitamin and

Table 1. Sociodemographic Characteristics of the Study Group

Variable	Category	n (%)
Child's Sex	Male	99 (72.8)
	Female	37 (27.2)
Child's Age (years)	Mean ± SD	8.96 ± 4.96
	Median (Min-Max)	7.0 (3.0-24.0)
Mother's Age (years)	Median (Min-Max)	37.0 (22.0-59.0)
Father's Age (years)	Median (Min-Max)	40.0 (23.0-62.0)
Mother's Education Level	High School Graduate	56 (41.2)
	Bachelor's Degree Graduate	24 (17.6)
	Middle School Graduate	17 (12.5)
	Associate Degree Graduate	17 (12.5)
	Primary School Graduate	16 (11.8)
	Graduate/Postgraduate Degree	5 (3.7)
	Illiterate / Cannot Read and Write	1 (0.7)
Father's Education Level	High School Graduate	46 (33.8)
	Bachelor's Degree Graduate	41 (30.1)
	Middle School Graduate	20 (14.7)
	Associate Degree Graduate	14 (10.3)
	Primary School Graduate	9 (6.6)
	Graduate/Postgraduate Degree	4 (2.9)
	Illiterate / Cannot Read and Write	2 (1.5)
Mother's Occupation	Not Employed	115 (84.6)
	White-Collar Worker	10 (7.4)
	Professional	5 (3.7)
	Worker	4 (2.9)
	Blue-Collar Worker	2 (1.5)
Father's Occupation	Worker	59 (43.4)
	White-Collar Worker	35 (25.7)
	Blue-Collar Worker	24 (17.6)
	Not Employed	12 (8.8)
	Professional	6 (4.4)
Number of people living in the house	Median (Min-Max)	4.0 (2.0-8.0)
Number of rooms in the house	Median (Min-Max)	4.0 (2.0-6.0)
Number of children	Median (Min-Max)	2.0 (1.0-5.0)

Note: Categorical variables are expressed as n (%), and continuous variables are presented as median (range).

Table 2. Current Educational Programs Received by Children with Autism in the Study Group

Type of Education	n	% (n = 136)
Special education	104	76.5
Individualized education	89	65.4
Speech and language therapy	63	46.3
Occupational therapy	46	33.8
Sensory integration therapy	20	14.7
Play therapy	16	11.8
Not receiving any education	7	5.1

Note. Categorical variables are presented as n (%). Participants could select more than one option.

mineral supplements (51.5%), and dietary supplements (44.1%). These were followed by natural bone broth (36.8%) and water-based activities (34.6%). Less frequently preferred methods included massage therapy (18.4%), equine-assisted therapy (11.8%), neurofeedback (2.9%), and hyperbaric oxygen therapy (2.2%). (Table 3).

Table 3. Rates of Use of Complementary and Alternative Medicine Methods

Method	n	% (n = 136)
Prayer	85	62.5
Vitamin and Mineral Supplements	70	51.5
Dietary Supplements	60	44.1
Bone Broth Supplements	50	36.8
Water Activities	47	34.6
Music Therapy	40	29.4
Herbal Products	38	27.9
Specific Diets (e.g., gluten-free)	34	25.0
Massage Therapy	25	18.4
Equine-Assisted Therapy	16	11.8
Neurofeedback	4	2.9
Hyperbaric Oxygen Therapy	3	2.2

Note. Percentages are calculated based on the total sample (n). As multiple methods could be selected, the total percentage may exceed 100%.

When the participants' views on the etiology of autism were examined (Table 4), the most frequently reported causes were found to be biologically and medically based. More than half of the families attributed autism to genetic causes (59.6%) and factors related to pregnancy and/or birth (51.5%). As a notable finding, 41.9% of the participants considered vaccines as a cause, followed by foods (24.3%), antibiotics (19.1%), and religious reasons/fate (18.4%). Factors such as mercury exposure (17.6%), infections (15.4%), and poor parenting style (6.6%) were reported at lower rates. In addition, 11.8% of the participants stated that they did not know the cause of autism.

When the sources from which participants obtained information about CAM methods were examined (Table 5), it was determined that the most common source of information was other parents of children with ASD, accounting for 52.9% (n = 72). This was followed, respectively, by physicians' recommendations (36.8%, n = 50),

Table 4. Parents' Perceptions of the Causes of Autism

Perceived Cause	n	% (n=136)
Genetic Factors	81	59.6
Pregnancy/Birth-Related Factors	70	51.5
Vaccines	57	41.9
Foods	33	24.3
Antibiotics	26	19.1
Religious Reasons/Fate	25	18.4
Mercury Exposure	24	17.6
Infections	21	15.4
Febrile Seizures	20	14.7
Medical interventions/Physician errors	15	11.0
Trauma	10	7.4
Poor Parenting Style	9	6.6
Unknown	16	11.8
Other	3	2.2

Note. Categorical variables are presented as n (%). Participants could select more than one option.

suggestions from special education teachers (31.6%, n = 43), and media/websites (30.9%, n = 42). Other less frequently consulted sources included friends (19.9%, n = 27), family members (14.0%, n = 19), and scientific journals (11.8%, n = 16). Additionally, 14.7% (n = 20) of the participants reported having no information on the subject, while 7.4% (n = 10) stated that they had received advice from herbalists.

Table 5. Sources of Information on Complementary and Alternative Methods

Source	n	% (n = 136)
Other parents of children with autism	72	52.9
Recommended by a doctor	50	36.8
Recommended by children's special educators	43	31.6
Media/Websites/Internet	42	30.9
Friends	27	19.9
Unaware / Unrecalled	20	14.7
Family Members	19	14.0
Scientific Journals	16	11.8
Recommended by herbalists	10	7.4
Other	5	3.7

Note. Percentages are calculated based on the total sample (n). Participants could select more than one option.

When the participants' monthly expenditure data on CAM methods were examined, it was determined that 60.3% of the families incurred financial expenditures for these methods. The mean monthly expenditure of families who reported spending was 6,407.93 ± 9,476.57 Turkish lira (TL), while the median expenditure was 3,000 TL. Regarding the distribution of expenditure ranges, 16.2% of the families paid between 5,001–10,000 TL, 14.7% paid between 2,001–5,000 TL, and 14.0% paid between 1,001–2,000 TL. The highest monthly expenditure recorded in the sample was 70,000 TL (Table 6).

Table 6. Monthly Expenditure on Complementary and Alternative Methods

Monthly expenditure range (TL)	n	% (n = 136)
0	54	39.7
1-500	5	3.7
501-1000	8	5.9
1001-2000	19	14.0
2001-5000	20	14.7
5001-10000	22	16.2
>10,000	8	5.9

Note. Expenditure data were quantified from free-text responses (e.g., "500 TL"). Summary statistics are presented for participants who reported any expenditure (>0 TL).

When the duration of use of CAM among families was examined, the largest group consisted of those who had been using these methods for more than 3 years, accounting for 27.2% (n = 37). Meanwhile, 22.8% of the families had been using these methods for less than 1 year (Table 7).

Table 7. Duration of Use of Complementary and Alternative Methods

Duration of Use	n	% (n = 136)
Less than 1 year	31	22.8
1-2 years	21	15.4
2-3 years	23	16.9
More than 3 years	37	27.2
Non-users	12	8.8
Unknown	12	8.8

Note. Categorical variables are presented as n (%).

Regarding the perceived effectiveness of CAM methods among the participants, the distribution of responses was as follows: 24 (17.6%) participants reported that the methods were not effective at all, 41 (30.1%) found them slightly effective, and 45 (33.1%) perceived a moderate level of effectiveness. In contrast, a smaller proportion of the group reported higher levels of benefit, with 8 (5.9%) indicating high effectiveness and 6 (4.4%) reporting very high effectiveness. Additionally, 12 participants (8.8%) stated that they had not used these methods.

When the evaluations of parents participating in the study regarding the benefits of CAM applications in their children with ASD were examined (Table 8), the most frequently reported positive effects were improvements in behavioral problems (33.8%; n = 46) and development in communication skills (32.4%; n = 44). These were followed by progress in learning skills (30.1%; n = 41) and reduction in sleep problems (28.7%; n = 39). A smaller proportion of participants reported that CAM applications contributed to overall medical condition (19.1%; n = 26) and improved feeding problems (17.6%; n = 24). In contrast, 18.4% of parents (n = 25) indicated that these applications provided no benefit to their children.

Table 8. Parent-Reported Perceived Benefits of Complementary and Alternative Medicine Methods

Perceived Benefit of CAM Methods	n	% (n = 136)
Parents reported benefits for behavioral problems	46	33.8
Parents perceived improvement in communication skills	44	32.4
Parents perceived improvement in learning skills	41	30.1
Parents reported reductions in sleep problems	39	28.7
Parents reported overall medical condition improvement	26	19.1
Parents reported no perceived benefit	25	18.4
Parents reported reductions in feeding problems	24	17.6
Non-users	12	8.8

Note. Categorical variables are presented as n (%). Participants could select more than one option

When the use of CAM methods was examined according to age groups (Figure 2), it was observed that parental preferences showed notable changes as children grew. In this context, prayer and vitamin/mineral supplements exhibited a steady increase with age, reaching the highest usage rates, whereas music therapy and specialized diets showed a fluctuating pattern, increasing during the school-age period (6-8 years), decreasing in the 9-12 age group, and peaking again during adolescence (13+ years). On the other hand, dietary supplements and water-based activities showed a marked decline particularly in the 9-12 age group, indicating that families dynamically updated supportive interventions according to the needs and symptoms emerging at different developmental stages of their children.

To identify the predictors associated with the absence of perceived benefit from CAM methods, a binary logistic regression analysis was conducted. The binary outcome variable strictly distinguished parents who reported a complete lack of efficacy ('provided no benefit / not effective at all', n = 25) from those who reported any degree of positive effect (n = 99) across the 124 active CAM users. The model incorporated child age, maternal education level, number of rooms in the residence (as a proxy for socioeconomic status), receipt of special education, and the primary source of information as independent variables. Model fit was significant according to the omnibus test of model coefficients (P = .002). The analysis revealed that child age was the only significant predictor for the reported lack of efficacy. Specifically, for every one-year increase in the child's age, the odds of parents perceiving no benefit from CAM decreased by approximately 16.2% (OR = 0.838; 95% CI, 0.762-0.921; P = .001).

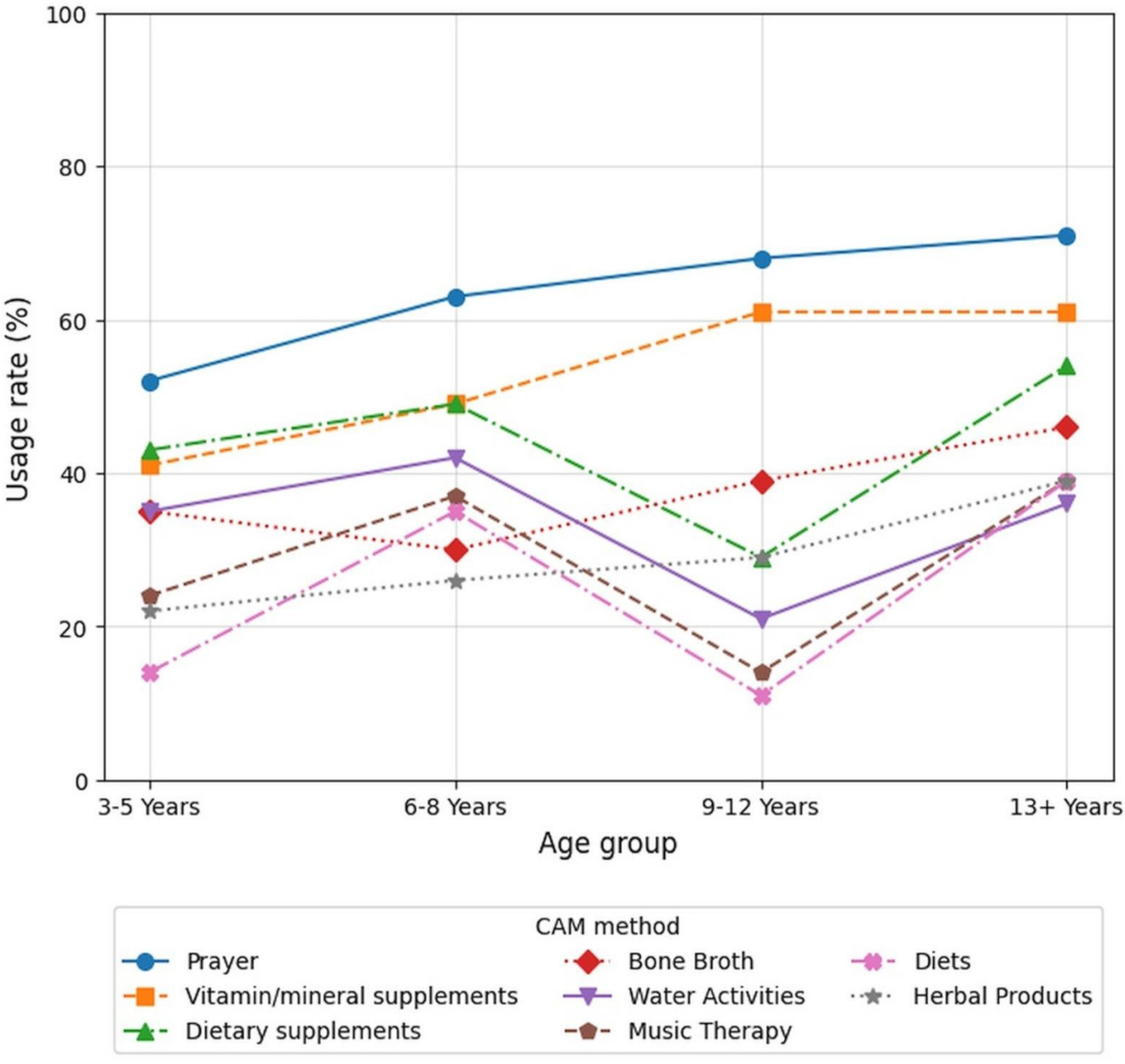

Figure 2. Age groups among CAM users (n = 124): 3-5 years (n = 34), 6-8 years (n = 40), 9-12 years (n = 25), ≥13 years (n = 25).

This indicates that younger age is associated with a significantly higher likelihood of reporting no perceived benefit. Other variables, including maternal education, number of rooms, receipt of special education, and information sources, did not demonstrate statistically significant independent effects on the outcome. Individual predictor significance was assessed using the Wald test with one degree of freedom (df = 1) for each parameter, as detailed in Table 9.

DISCUSSION

In this study, the patterns of CAM use among parents of children diagnosed with ASD, the perceived benefits of these methods, and the families' sociodemographic characteristics were examined. The findings indicate that CAM use was highly prevalent, that preferences were shaped by information sources and accessibility, and that younger child age was the only significant independent predictor of parents reporting no perceived benefit.

When parents' perceptions regarding the causes of autism were examined, biologically and medically based factors were found to be predominant. More than half of the families identified genetic factors (59.6%) and pregnancy or birth-related factors (51.5%) as causes of autism. This finding supports the existing literature emphasizing that biological explanations are widely accepted by parents.[13]

Table 9. Logistic Regression Model for Predicting No Perceived Benefit from Complementary and Alternative Medicine Methods

Variable	Estimate (β)	SE	Wald x^2/df	P	OR	95% CI for OR
Child's age (years)	-0.177	0.05	13.47/1	.001	0.838	0.762–0.921
Maternal education (High School and under vs. University)	0.827	0.49	2.812/1	.094	2.287	0.870–6.017
Number of rooms (≤3 vs ≥4)	-0.485	0.43	1.272/1	.259	0.615	0.265–1.431
Special education (Not receiving vs. Receiving)	0.015	0.90	0.000/1	.986	1.015	0.176–5.870
Primary source of information (Ref: Peer/Interpersonal)						
Media/Journals/Other	-0.170	0.59	0.083/1	.773	0.844	0.266–2.678
Professionals/Educators	0.264	0.55	0.235/1	.628	1.303	0.447–3.793

Note: SE = Standard Error, CI = Confidence Interval. Model omnibus P = .002. Because the number of outcome events was limited, the logistic regression findings should be interpreted as exploratory.

On the other hand, in our study, 41.9% of the participants considered vaccines as a cause of ASD, followed by foods (24.3%), antibiotics (19.1%), and religious reasons/fate (18.4%). In a study conducted by Harrington et al., 54% of parents identified vaccines as the most frequent cause of ASD.[14] This finding indicates that concerns regarding vaccines as a potential cause of autism remain current and continue to be a significant perception among parents. This perception may be considered one of the factors influencing the motivation to pursue complementary and CAM methods. Although a substantial proportion of parents endorsed vaccines as a perceived cause of ASD, this finding should be interpreted as a parental belief rather than evidence of causality, as current scientific evidence does not support a causal association between vaccination and ASD.

CAM methods in children diagnosed with ASD have been widely investigated in the current literature. A systematic review published in 2016 reported that the usage rates of CAM methods among individuals with ASD varied considerably, generally ranging from 28% to 95%. Additionally, special diets and nutritional supplements emerged as the most frequently used CAM methods in 75% of the studies.[9] In our study, the vast majority of participants (91.2%) were found to have used at least one CAM method, a rate that is near the upper limit of the range reported in the systematic review. This indicates a high interest in CAM use within our sample and the widespread nature of these preferences.

Similar trends have also been observed in previous studies conducted in our country; in a multicenter study involving 172 parents, 56% of the participants were found to have used at least one CAM method, with praying identified as the most frequently used method.[12] In another study, 38 parents were examined, and nutritional supplements and special diets were reported as the most common CAM methods.[11] In a recent study conducted in Germany involving 192 parents, it was reported that 45% of the participants used at least one CAM method, with acupuncture, yoga, and biofeedback being the most frequently used methods.[15] In our study, the most frequently used methods were identified as prayer (62.5%), vitamin and mineral supplements (51.5%), and dietary supplements (44.1%), followed by natural bone broth (36.8%) and water-based activities (34.6%). It is important to note that while prayer is a highly prevalent practice, it functions primarily as a religious or spiritual coping mechanism for families rather than a biologically based medical intervention. The fact that only 8.8% of families did not use any CAM method indicates that families largely adopted CAM methods to support their children's development and particularly prioritized low-risk and accessible practices. These findings demonstrate that parents, in addition to standard treatment and educational practices, developed multidimensional and personalized strategies tailored to their children's needs. The variation in CAM methods used across studies suggests that the selection of these methods is not limited solely to accessibility or individual preferences but is also influenced by cultural and societal beliefs and traditions.

When the duration of CAM use was examined, it was observed that a substantial proportion of families had continued these practices for a long period, with the largest group consisting of parents who had used CAM

methods for more than three years (27.2%). In contrast, 22.8% of families had used these methods for less than one year, and 8.8% were found not to use any CAM method. These findings suggest that the duration of CAM use is not homogeneous among families, with CAM practices becoming long-term and sustained for some families, while remaining limited or at an exploratory stage for others. Similar studies reported in the literature have indicated that a considerable proportion of parents maintained CAM practices for at least one year, emphasizing that low-risk and easily accessible methods are more likely to be used over extended periods.[16] The present findings indicate that the duration of CAM use is a dynamic process shaped by parents' perceived benefits, expectations, and individual circumstances.

Our study examined the processes by which parents obtained information about CAM methods. The prominence of other parents of children with ASD as the primary source indicates that shared experiences play a determining role in the decision-making process. This finding is consistent with previous research demonstrating that CAM recommendations are frequently derived from accessible, experience-based sources, such as friends, family members, and the internet.[17] In both studies, physicians and other professionals working in the health or education fields were included among the sources of information; however, they were often not the primary sources consulted. Nevertheless, the notable contribution of physicians and special educators in the present study suggests that parents tend to rely not only on their social networks but also on opinions based on professional expertise when making decisions regarding CAM use. In contrast, the limited rates of consultation of evidence-based sources such as scientific publications and books indicate that parents prefer channels that are more easily accessible and more directly related to daily life rather than academic content. This finding highlights the need to strengthen the guiding and informative role of health and education professionals in delivering accurate and up-to-date information about CAM methods to families.

In this study, it was determined that a substantial proportion of families (60.3%) incurred regular financial expenditures on CAM methods. The expenditure amounts varied considerably among the participants. Notably, the mean monthly expenditure was substantially higher than the median, with maximum monthly costs reaching as high as 70,000 TL. This skewed distribution indicates that while a majority of families spend moderate amounts, a distinct subset incurs exceptionally high out-of-pocket costs for these alternative interventions. Given that ASD is already associated with a significant overall economic burden for families and society due to standard educational and medical needs, the added costs of CAM practices can further exacerbate this financial strain. These findings highlight that CAM use may impose a substantial, often overlooked economic burden. Consequently, this financial dimension should be systematically addressed in clinical evaluations. Openly discussing these costs can enable healthcare professionals to guide families toward cost-effective, evidence-based interventions and protect them from potential financial toxicity.

When parents' perceived benefits of CAM applications were examined, they were found to be most prominent in the areas of behavioral problems (33.8%) and communication skills (32.4%). Progress in learning skills (30.1%) and reductions in sleep problems (28.7%) also emerged as other domains in which notable benefits were reported. Approximately 18.4% of parents reported no perceived benefit, while 8.8% indicated that they had not used CAM applications. In one study reported in the literature, approximately 38% of parents using CAM in children with ASD observed "some improvement" in their children, 18.4% reported marked improvement, whereas 38% reported no noticeable change, and a small proportion (2.6%) observed negative effects in their children.[18] These data indicate that the effects of CAM methods are heterogeneous among families and that perceived benefits may be related to factors such as the child's condition, the type of method used, and the duration of application. In addition, it appears that perceived benefits are primarily based on subjective assessments and may be shaped by expectations; this underscores the importance of establishing realistic expectations in clinical guidance and family education processes.

The examination of CAM use by age groups indicates that parents dynamically updated applications according to their children's needs and developmental stages. The literature reports that the first few years immediately following diagnosis constitute the most intensive period of CAM exploration for families.[19] The increased use of methods targeting social-sensory interaction, such as music therapy and water-based activities, particularly in the 6–8-year age range, reflects parents' motivation to support the rehabilitation process following the confirmation of an ASD diagnosis. The temporary decline observed in the 9–12-year age group may be explained by families' increased focus on academic achievement or the child's resistance to treatment during this period. Some studies in the literature indicate that as age increases and academic and social expectations rise, families tend to favor more biologically based methods (e.g., vitamins, special diets); this finding parallels our study, in which CAM use cumulatively increased with age and the preferred methods diversified.[20] A notable finding of our study is the marked increase in the use of vitamin and mineral supplements and herbal products during the transition to adolescence. In this period, increased self-care awareness in adolescents with ASD, along with frequently co-occurring anxiety, sleep disturbances, or sensory sensitivities, directs families toward biologically based and supportive interventions. The rise in herbal product use carries clinically significant risks; particularly in individuals with ASD who are taking

psychotropic medications, uncontrolled herbal supplements may lead to potential pharmacological interactions that complicate treatment management. This emphasizes that CAM use during adolescence should be closely monitored by clinicians not only in terms of frequency and preferences but also with regard to safety and treatment planning.

When examining the predictors associated with the absence of perceived benefit from CAM methods, our logistic regression analysis revealed that a younger child age significantly increased the likelihood of parents reporting no positive effect. In contrast, sociodemographic factors, receipt of special education, and the primary source of information did not independently predict this outcome. This finding is clinically highly relevant. In the early years following an ASD diagnosis, core symptoms are often more pronounced, and developmental trajectories remain highly dynamic. Parents of younger children may harbor higher or more acute expectations for rapid symptomatic improvement when initiating CAM. When these expectations are unmet, they are more likely to perceive the intervention as ineffective. Conversely, as children grow older, parents may recalibrate their expectations or selectively utilize CAM methods targeted at specific, manageable comorbidities such as sleep disturbances or anxiety, thereby reporting higher subjective efficacy. These findings may also reflect expectation-related parental perceptions rather than objective treatment effects.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design of the research limits the ability to draw causal inferences between CAM use, information sources, and perceived benefits. Second, the data were collected via self-report questionnaires, which introduces the potential for recall bias. The self-report form regarding CAM use was developed by the researchers and achieved content validity through expert consensus; however, it lacks rigorous psychometric validation such as pilot testing or test-retest reliability. Furthermore, the perceived benefits reported by parents are inherently subjective and were not corroborated by objective clinical evaluations. Importantly, the severity of ASD symptoms and levels of intellectual or language impairment were not formally measured or controlled for in the current analysis, which represents a significant limitation as these clinical factors may heavily influence both CAM preferences and perceived outcomes. The sample was drawn from a single clinical center, which may limit the generalizability of the findings to the broader ASD population. Finally, out of 550 patients and families contacted, 136 agreed to participate, yielding a response rate of approximately 24.7%. This raises the possibility of volunteer and selection bias, as families who are more active or interested in CAM practices may have been more inclined to participate in the study. In addition, the number of outcome events in the logistic regression model was limited; therefore, the regression findings should be interpreted as exploratory.

CONCLUSION

In conclusion, this study contributes to the limited regional data on CAM use in ASD and highlights the psychosocial dimension of perceived benefit. CAM use in children with ASD appears to be a common and highly dynamic process, with parental preferences shaped by the child's age, developmental stage, needs, and feedback from their social environment. Contrary to initial assumptions, our analysis demonstrated that the degree of perceived benefit is not independently predicted by the primary source of information or sociodemographic factors when adjusting for clinical variables. This indicates that parental benefit perception is inherently subjective, multifactorial, and deeply individualized. Given the high prevalence, substantial out-of-pocket costs, and potential risks for treatment interactions, CAM use must be carefully monitored in clinical settings. These findings support the need for clinicians to ask about CAM use in a non-judgmental manner and to provide families with balanced, evidence-based guidance.

Peer-review: Externally peer-reviewed.

Ethics Committee Approval: Ethics committee approval was obtained from the Ondokuz Mayıs University Clinical Research Ethics Committee (Approval No: 2025/140; Date: April 21, 2025). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent: Written informed consent was obtained from the parents or legal guardians of participants younger than 18 years. For participants aged 18–25 years, the capacity to provide autonomous informed consent was clinically assessed by the attending psychiatrist before enrollment. For participants aged 18–25 years who had the capacity to provide autonomous consent, written informed consent was obtained directly from the participants.

Reporting Guideline: This observational cross-sectional study was reported in accordance with the STROBE guideline. The completed STROBE checklist is provided as Supplementary Material 1.

Data Availability Statement: The dataset analyzed during the current study is available from the corresponding author upon reasonable request.

Artificial Intelligence (AI) Tools Disclosure: The authors declare that no AI-based tools (including large language models, generative AI, or AI-assisted writing tools) were used in the preparation, writing, or analysis of this manuscript.

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Author Contributions

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Supplementary Material 1. The completed STROBE checklist is available as an online supplementary file.

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