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Parental Perceptions and Practices of Complementary and Alternative Therapies for Autism in Türkiye

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Abstract

This cross-sectional descriptive survey examined parental use of complementary and alternative therapies (CATs) for children with autism spectrum disorder (ASD) in Türkiye. Following the classification adopted in major reviews of autism interventions (National Autism Center, 2015; Wong et al., 2015), CATs were operationally defined as practices and products falling outside the corpus of established evidence-based practices (EBPs) for ASD; sensory integration therapy was included on this basis, as it has consistently been identified as an intervention with insufficient empirical support in this population. Data were collected from 210 parents recruited through convenience sampling via social media and special education institutions, using a researcher-developed instrument reviewed by ten doctoral-level experts in special education and pilot-tested with five families. Most participants (73.3%) reported having used at least one CAT, and 16.6% had tried four or more. Vitamin and mineral supplements (37.1%), sensory integration therapy (30.3%), and the gluten/casein diet (26.0%) were the most frequently reported practices. Information sources included special education institutions, health professionals, other families, and the internet. A moderate, statistically significant association was observed between parental age and the number of CATs used. Parents most often reported perceived improvements in attention span and reductions in repetitive behaviors; however, discontinuation rates were high across nearly all therapies, with reasons including limited perceived benefit, financial burden, and reported adverse events such as sleep disturbances and aggression.

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Because the findings rely on parental self-report rather than objective outcome measures, they should be interpreted as a descriptive mapping of parental practices that can inform culturally sensitive professional guidance and family-support efforts in Türkiye.
Keywords: Autism spectrum disorder; Complementary and alternative therapies; Evidence-based practices; Parental perceptions; special education; Türkiye.

Türkiye'de Otizmde Tamamlayıcı ve Alternatif Tedavilere Yönelik Ebeveyn Algıları ve Uygulamaları

Öz

Bu kesitsel betimsel tarama çalışması, Türkiye'de otizm spektrum bozukluğu (OSB) olan çocukların ebeveynlerinin tamamlayıcı ve alternatif tedavi (TAT) kullanımını incelemiştir. Otizm müdahalelerine ilişkin başlıca derlemelerde benimsenen sınıflandırma çerçevesi (National Autism Center, 2015; Wong ve ark., 2015) doğrultusunda TAT'ler, OSB için yerleşik kanıt temelli uygulamalar (KTU) bütünü dışında kalan uygulama ve ürünler olarak işevuruk biçimde tanımlanmıştır; duyu bütünleme terapisi, bu popülasyonda yetersiz ampirik desteğe sahip bir müdahale olarak tutarlı biçimde tanımlanması nedeniyle TAT kapsamında değerlendirilmiştir. Veriler, sosyal medya ve özel eğitim kurumları aracılığıyla kolayda örnekleme yöntemiyle ulaşılan 210 ebeveynden, özel eğitim alanında doktora derecesine sahip on uzmanın görüşüne sunulmuş ve beş aile ile pilot uygulaması yapılmış araştırmacı tarafından geliştirilen bir veri toplama aracı kullanılarak elde edilmiştir. Katılımcıların büyük çoğunluğu (%73.3) çocuklarında en az bir TAT kullandıklarını, %16.6'sı ise dört ve daha fazla TAT denediklerini bildirmiştir. En sık bildirilen uygulamalar vitamin ve mineral takviyeleri (%37.1), duyu bütünleme terapisi (%30.3) ve glüten/kazein diyetidir (%26.0). Bilgi kaynakları arasında özel eğitim kurumları, sağlık profesyonelleri, diğer aileler ve internet yer almıştır. Ebeveyn yaşı ile kullanılan TAT sayısı arasında orta düzeyde, istatistiksel olarak anlamlı bir ilişki gözlenmiştir. Ebeveynler en sık dikkat süresinde algılanan iyileşmeler ve yineleyici davranışlarda azalma bildirmekle birlikte, neredeyse tüm uygulamalarda bırakma oranları yüksek olmuş; bırakma gerekçeleri arasında sınırlı algılanan yarar, mali yük ve uyku sorunları ile saldırganlık gibi bildirilen yan etkiler yer almıştır. Bulgular nesnel sonuç ölçümlerinden değil ebeveyn öz-bildirimlerinden elde edildiği için, Türkiye'de kültürel duyarlılık taşıyan profesyonel rehberlik ve aile destek çalışmalarını bilgilendirebilecek, ebeveyn uygulamalarına ilişkin betimsel bir haritalama olarak yorumlanmalıdır.

Anahtar Kelimeler: Otizm spektrum bozukluğu; Tamamlayıcı ve alternatif tedaviler; Kanıt temelli uygulamalar; Ebeveyn algıları; Özel eğitim; Türkiye.

Introduction

The Complex Nature of Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by persistent differences in social communication and interaction, alongside restricted and repetitive behavioral patterns (American Psychiatric Association, 2022). The most recent surveillance data from the U.S. Centers for Disease Control and Prevention indicate that approximately 1 in 36 children is identified with ASD, underscoring its public health relevance. Its etiology is multifactorial, involving genetic predispositions and environmental contributors, and no single causal pathway has been established. The clinical heterogeneity of ASD spans a wide range of phenotypic presentations and frequently co-occurs with motor coordination differences (Bremer and Cairney, 2018) and atypical sensory profiles (Galiano et al., 2024), which has implications for treatment planning, as no single intervention can be universally effective. This heterogeneity has also prompted ongoing efforts to refine diagnostic criteria for core presentations (Mottron and Gagnon, 2023). For families, the absence of a uniformly effective treatment pathway often leads to a complex and prolonged decision-making process when selecting among available interventions.

The Use of Complementary and Alternative Medicine in Pediatric Populations

The use of practices outside conventional medical care is not unique to ASD. Complementary and Alternative Medicine (CAM) — defined by the National Center for Complementary and Integrative Health (2021) as a broad group of health practices and products not generally regarded as part of standard medical care — is widely reported among families of children with chronic conditions. Recent studies illustrate this pattern across diverse pediatric populations, including children with inflammatory bowel disease (Guilcher et al., 2025), pediatric gastroenterology patients more broadly (Adams et al., 2014), and across multiple chronic illness categories examined in systematic review (Leach et al., 2024). Parental motivations for CAM use typically include dissatisfaction with the perceived limitations of conventional treatment, preference for approaches viewed as more holistic, and the desire to support a child's developmental outcomes and quality of

life. In this framing, CAM is most often pursued as a supplement to, rather than a replacement for, conventional care.

The Landscape of CAM Use in ASD

Within the pediatric population, the reported use of CAM is particularly high among families of children with ASD (Goin-Kochel et al., 2009; Hanson et al., 2007). Families commonly engage a range of interventions, with nutritional approaches — including specialized diets and vitamin/mineral supplementation — among the most frequently reported (Perrin et al., 2012). The empirical status of many of these interventions, however, remains an active area of scientific scrutiny: recent systematic reviews have characterized the evidence base for several popular CAM interventions in ASD as limited or inconclusive (Levy and Hyman, 2015). The persistence of interventions with weak empirical support has been examined as a longstanding methodological and professional issue in the field (Travers et al., 2016) and has been linked to the influence of experiential and anecdotal accounts in shaping intervention choices (Foxx, 2008; Metz et al., 2005). These analyses point to a recurring asymmetry between intervention popularity and the strength of available evidence — an asymmetry that motivates continued empirical mapping of parental practices across cultural contexts.

Evidence-Based Practices in Autism Intervention

In parallel with the expanding use of CAM, the field of autism intervention has developed a structured framework of evidence-based practices (EBPs). EBPs are interventions identified through systematic reviews of peer-reviewed empirical research as having sufficient evidence of effectiveness for individuals with ASD (Hume et al., 2021; National Autism Center [NAC], 2015; Steinbrenner et al., 2020; Wong et al., 2015). Comprehensive EBP-based service models, such as the Center for Autism and Related Disorders (CARD) model, illustrate how data-driven decision-making and continuous progress monitoring can be operationalized in clinical practice (Granpeesheh et al., 2010). Reports from the NAC and the National Clearinghouse on Autism Evidence and Practice (NCAEP) provide regularly updated classifications of interventions as established, emerging, or unestablished, based on the strength of available empirical support. Of particular relevance to the present study, the empirical status of sensory integration therapy has evolved across successive reviews. While earlier reviews (NAC, 2015; Wong et al., 2015) did not classify sensory integration

as an established EBP for ASD, the most recent third-generation NCAEP review (Hume et al., 2021; Steinbrenner et al., 2020) reclassified the manualized form — Ayres Sensory Integration® (ASI®) — as a focused EBP, an interpretation also supported by independent systematic reviews applying Council for Exceptional Children quality standards (Schoen et al., 2019). Importantly, this updated EBP status applies specifically to manualized ASI® delivered by therapists with formal training and fidelity monitoring; the broader category of sensory-based interventions, which characterizes much of the practice delivered in Turkish service settings without formal ASI® fidelity requirements, has not been classified as an established EBP. The Method section provides a detailed rationale for the inclusion of sensory integration among the CAT categories examined in this study.

Parental Decision-Making and Information Sources

Parental decisions regarding CAM use are shaped by an interaction of informational, structural, and psychosocial factors (Hanson et al., 2007). Systematic reviews have consistently identified social networks — including family members, peers, and professionals — as influential sources of intervention recommendations (Goin-Kochel et al., 2009). In recent years, online communities and social media platforms have become increasingly central to how families exchange experiential information, often outside the regulatory and methodological standards that govern peer-reviewed evidence. Structural factors, including the cost and limited availability of intensive EBPs, can further influence treatment-seeking behavior, alongside parental motivation to actively pursue developmental gains for their child. The cumulative effect of these factors has been described in the literature as a sequential trial-and-error pattern, in which families allocate considerable time, financial, and emotional resources to a series of interventions with variable outcomes.

The Turkish Context and Rationale for the Present Study

Although the international literature on CAM use in ASD has expanded considerably over the past two decades, comprehensive empirical data from the Turkish context remain limited. Several features of this context warrant focused investigation. First, ASD-related rehabilitation services in Türkiye are delivered through a multi-layered structure involving the Ministry of National Education, the Ministry of Health, and private special education and rehabilitation centers, with families navigating between these

systems while managing partially state-funded session allocations. Second, extended family networks and informal community channels play a substantial role in health-related decision-making in Turkish families, which may amplify the influence of experiential and culturally embedded information sources on intervention choices. Third, Türkiye has one of the highest rates of social media penetration among middle-income countries, creating dense informal information ecosystems that may differ from those documented in Western samples. The interaction of these systemic, cultural, and informational factors may produce CAT-use patterns that are not fully captured by existing international data.

Accordingly, the present study aims to provide descriptive national-level evidence on which CATs Turkish parents of children with ASD use, where they obtain information about them, how they evaluate the perceived outcomes, and how use is associated with selected demographic characteristics. The intent is to establish a baseline that can inform subsequent culturally informed research, professional training, and policy planning rather than to make causal or clinical-effectiveness claims.

Study Aims and Research Questions

The primary aim of this cross-sectional descriptive survey is to map the prevalence, information-seeking patterns, perceived effectiveness, and discontinuation patterns of CATs reported by parents of children with ASD in Türkiye. Consistent with the descriptive nature of the design, the following research questions guided the study:

1. What is the prevalence of CAT use among families of children with ASD in Türkiye, and which CAT types are most frequently reported?
2. From which sources do parents obtain information about CATs?
3. What is the parent-reported level of perceived effectiveness and overall satisfaction with the CATs used, and what reasons do parents report for discontinuing these therapies?
4. Is there a statistically significant association between selected demographic characteristics (specifically parental age) and the number of CATs reported as used?

Method

Research Design

This study employed a cross-sectional descriptive survey design (Fowler, 2014; Ponto, 2015) to map the prevalence, information sources,

perceived effectiveness, discontinuation patterns, and demographic correlates of complementary and alternative therapies (CATs) reported by parents of children with autism spectrum disorder (ASD) in Türkiye. The descriptive orientation reflects the study's primary aim — to provide foundational national-level data — rather than to test causal hypotheses or evaluate intervention efficacy. Accordingly, parental reports were treated as descriptive indicators of family practices and perceptions, not as outcome measures of therapeutic effectiveness.

Participants

Sampling Strategy

Participants were recruited through convenience sampling. Two complementary recruitment channels were used: (a) social media platforms (parent groups dedicated to ASD and dissemination through professional networks of special education practitioners), and (b) special education and rehabilitation institutions that agreed to forward the survey link to families enrolled in their programs. Recruitment took place over approximately six months. The decision to use convenience sampling was driven by the absence of a centralized national registry of children with ASD in Türkiye from which probability sampling could be conducted; the implications of this design choice for representativeness and generalizability are addressed in the Limitations section of the Discussion.

Inclusion and Exclusion Criteria

Inclusion criteria were: (a) being a parent of a child with a formal clinical diagnosis of ASD, (b) the child being between 3 and 18 years of age at the time of data collection, and (c) ability to read and respond in Turkish. Diagnosis was operationalized through parental report of an ASD diagnosis received from a licensed health professional. To support the transparency of this verification step, the questionnaire asked parents to indicate the diagnosing institution type (university hospital, state hospital, private clinic, or Guidance and Research Center [Rehberlik ve Araştırma Merkezi]); however, formal clinical confirmation of diagnoses was not within the scope of the present design, and this limitation is acknowledged below.

Exclusion criteria were applied during data screening and included: (a) responses from parents whose child was outside the 3–18 age range; (b) incomplete responses; (c) duplicate submissions identified through device and timestamp inspection; and (d) responses completed in an unrealistically

short time, operationalized as completion in less than 40% of the median completion time observed in pilot testing and treated as inattentive responses (Meade and Craig, 2012). Of the 267 initial submissions, 57 were excluded based on these criteria, yielding a final analytic sample of N = 210.

Sample Characteristics

Of the 210 participating parents, 73.8% (n=155) were women and 26.2% (n=55) were men. Parental ages ranged from 23 to 56 years (M=37.3). Most participants reported a high school (31.4%) or undergraduate (32.4%) educational level. The most frequently reported occupations were homemaker (48.6%) and teacher (14.8%). Reported monthly household income was distributed across four bands: 0–2.000 TL (28.1%), 2.001–4.000 TL (37.6%), 4.001–6.000 TL (18.6%), and 6.001 TL or above (15.7%). Most families reported having two children (45.7%). The largest share of participants resided in the Marmara region (41.0%), followed by the Aegean (12.9%) and Mediterranean (9.5%) regions. Full demographic characteristics are presented in Table 1.

Table 1. Characteristics of the Participants (N=210)

Variable	Category	n	%
Gender	Woman	155	73.8
	Man	55	26.2
Education	Primary school	31	14.8
	Middle school	17	8.1
	High school	66	31.4
	Vocational school	15	7.1
	Undergraduate	68	32.4
	Graduate (MA/PhD)	13	6.2
Occupation	Homemaker	102	48.6
	Teacher	31	14.8
	Industrial worker	26	12.4
	Civil servant	23	11.0
	Private-sector employee	17	8.1
	Other	11	5.2
Monthly household income	0–2.000 TL	59	28.1
	2.001–4.000 TL	79	37.6
	4.001–6.000 TL	39	18.6
	6.001 TL and above	33	15.7
Number of children	1	73	34.8
	2	96	45.7
	3	31	14.8
	4 or more	10	4.8
Region of residence	Marmara	86	41.0
	Aegean	27	12.9
	Mediterranean	20	9.5
	Southeastern Anatolia	20	9.5
	Central Anatolia	19	9.0
	Black Sea	16	7.6
	Eastern Anatolia	6	2.9

Data Collection Instruments

A researcher-developed online questionnaire was used to collect data. Online survey methodology was selected for its accessibility, geographic reach, and efficiency for descriptive survey research in social and behavioral sciences (Bourque and Fielder, 2003; Hewson et al., 2003). The instrument was developed through a four-phase process designed to support content validity.

Operational Definition and Classification of CATs

For the purposes of this study, CATs were operationally defined as interventions and products that fall outside the corpus of practices currently classified as evidence-based for individuals with ASD by major international evidence reviews — specifically, the National Standards Project, Phase 2 (NAC, 2015) and the comprehensive review of focused intervention practices for children, youth, and young adults with ASD by Wong et al. (2015). Interventions categorized in these reviews as "unestablished" or as lacking sufficient evidence for the ASD population were included as CATs in the present study.

This operational definition warrants explicit clarification with regard to sensory integration therapy, as its empirical-status classification has evolved over the past decade and remains an area of nuanced scientific debate. Earlier major reviews — including the National Standards Project, Phase 2 (NAC, 2015) and the second-generation review by Wong et al. (2015) — did not classify sensory-based interventions as established EBPs for the ASD population. However, the most recent third-generation NCAEP systematic review (Hume et al., 2021; Steinbrenner et al., 2020) reclassified Ayres Sensory Integration® (ASI®) — that is, the manualized, fidelity-controlled form of the intervention delivered by therapists with formal ASI® training — as a focused EBP, an interpretation also supported by an independent systematic review applying Council for Exceptional Children quality standards (Schoen et al., 2019). Importantly, this updated EBP classification is specific to manualized ASI®; the broader category of sensory-based interventions (e.g., sensory diets, sensory rooms, brushing protocols, eclectic sensory activities) has been explicitly distinguished from ASI® and is not classified as an established EBP, as its delivery often departs from ASI® core principles (Schoen et al., 2019).

In the present study, parents were asked about "duyu bütünleme terapisi" (sensory integration therapy) using familiar Turkish terminology, without specifying whether the intervention received met ASI® fidelity criteria. In the Turkish special education and rehabilitation context, this intervention is most commonly delivered without formal ASI® certification requirements and frequently incorporates a range of sensory-based activities that may not correspond to the manualized ASI® protocol. We therefore retain sensory integration among the CAT categories on the basis that the broader practice of sensory-based interventions, as commonly understood and reported by parents in this sample, has not been uniformly classified as an established EBP.

Instrument Development Phases

Phase 1 — Item pool generation. A panel of 30 stakeholders — 10 special education teachers working with children with ASD, 10 parents of children with ASD, and 10 academics in the field of special education — was consulted through structured open-ended prompts to generate an initial pool of CATs encountered in Turkish ASD practice. From this pool, 13 distinct therapies were retained based on convergence of mentions across the three stakeholder groups.

Phase 2 — Draft questionnaire development. A draft questionnaire was constructed comprising three sections: (a) a demographic section, (b) a section on psychotropic medication use, and (c) a parallel section for each of the 13 selected CATs. Within each CAT section, parents were asked about source, duration, cost, perceived effectiveness on a 5-point scale (definitely does not work / does not work / not sure / works / definitely works), domain of benefit, side effects, recommendation, and current continuation.

Phase 3 — Content validation. The draft questionnaire was submitted to a separate panel of 10 academics holding a doctorate in special education for content validation. Qualitative feedback was used to revise item wording and to expand response options; revisions were retained when at least 8 of the 10 expert reviewers indicated that the change improved item clarity or representativeness. A quantitative content validity index (CVI) was not computed during this phase; this is identified as a methodological limitation in the Discussion (Polit and Beck, 2006).

Phase 4 — Pilot testing. The revised questionnaire was implemented on Google Forms and pilot-tested with five parents of children with ASD.

The pilot phase focused on technical functionality and item comprehensibility; the median completion time was approximately 18 minutes. No content revisions were required following piloting.

Because the instrument consists of structured items capturing categorical and frequency-based information rather than items intended to measure a single underlying psychological construct, internal-consistency reliability coefficients such as Cronbach's α are not applicable to the instrument as a whole.

Data Collection and Analysis

Data Collection Procedure

Data were collected between 2019 and 2021. The survey link was disseminated through the recruitment channels outlined above and remained open for approximately six months during this period. The Google Forms platform was configured to: (a) prevent duplicate submissions from the same account, (b) record submission timestamps to enable inattentive-response screening, and (c) require informed consent before access to the questionnaire items.

Reporting of Monetary Amounts

All monetary amounts reported in this study refer to Turkish lira (TL) values as recorded by parents at the time of data collection. To facilitate international comparability, approximate equivalents in U.S. dollars (USD) are presented in parentheses; these were calculated using the average TL/USD exchange rate observed during the data-collection period (approximately 1 USD ≈ 12 TL during 2020–2021; Central Bank of the Republic of Türkiye, 2021). Given the substantial volatility of the TL/USD exchange rate, USD figures should be interpreted as approximate reference values.

Data Analysis

Data were analyzed using IBM SPSS Statistics (version 25). To address Research Questions 1–3 (prevalence, information sources, perceived effectiveness, discontinuation), descriptive statistics — frequencies, percentages, means — were computed for the full sample and for the subsample of parents who reported having used each specific CAT. Percentages for therapies with small user subsamples ($n < 10$) are reported alongside absolute frequencies and explicitly flagged as exploratory.

To address Research Question 4, chi-square tests of independence were used to examine relationships between categorical variables, with phi (φ) for 2 × 2 tables or Cramér's V for larger tables reported as effect-size statistics, interpreted following Cohen's (1988) conventions. The expected-cell-frequency assumption (≥ 5 in at least 80% of cells) was inspected for each analysis; analyses violating this assumption are not reported. The significance threshold was $\alpha = .05$, and exact p-values are reported to three decimal places, with values smaller than .001 reported as $p < .001$ in accordance with APA 7 conventions.

Ethical Considerations

This study was conducted in accordance with the ethical principles for research involving human participants set forth in the Declaration of Helsinki (World Medical Association, 2013). Formal institutional ethics approval was obtained from the Social and Human Sciences Scientific Research and Publication Ethics Committee of İzmir Democracy University (Protocol No. 2026/49; Decision No. 2026/03-02; date of approval: 05 March 2026). The committee reviewed the study protocol, the data-collection instrument, and the informed-consent procedures, and approved the study as ethically appropriate.

Prior to data collection, all prospective participants were presented with a digital informed-consent form embedded in the online questionnaire. This form described the aim and scope of the study, the voluntary nature of participation, the right to withdraw, procedures for protecting confidentiality and anonymity, and the contact information of the principal investigator. Participants were required to indicate informed consent before they could access the questionnaire items. No financial incentives were offered. No personally identifying information (e.g., names, email addresses, IP addresses) was collected. All data were stored in a password-protected digital environment accessible only to the research team.

Results

The findings are presented in four subsections. The first provides a brief overview of general therapy use across the analytic sample. The second summarizes the patterns of CAT use across the 13 included therapies in a single consolidated table (Table 2), with narrative organized around five natural therapy clusters. The third presents the perceived outcomes, side effects, and continuation patterns in a second consolidated table (Table 3),

using the same cluster-based narrative organization. The fourth subsection reports statistically significant associations among demographic variables and CAT use (Table 4). Throughout, findings based on small user subsamples (n<10) are explicitly flagged as exploratory and interpreted with caution. Interpretive commentary regarding the meaning of the findings is reserved for the Discussion.

Overview of General Therapy Use

Of the 210 parents in the analytic sample, 47.1% (n=99) reported that their child had used psychotropic medication at some point, and 74.5% of these parents (n=74) indicated that the medication was still in use at the time of data collection. The most frequently reported pharmacological agents were risperidone-based products (70.4% of medication users), aripiprazole-based products (35.7%), and methylphenidate- and atomoxetine-based products (each 17.3%). With respect to CATs, 73.3% (n=154) of parents reported that their child had used at least one CAT, and 16.6% (n=35) reported having used four or more.

Patterns of CAT Use Across Therapies

Table 2 presents the prevalence, dominant information source, typical duration of use, median total cost, and most frequently cited perceived benefit for each of the 13 included CATs. The narrative below organizes these findings around five natural therapy clusters.

Nutrition-Based Interventions

This cluster includes vitamin and mineral supplementation (37.1%, n=78), the gluten/casein-free diet (26.0%, n=55), and the Gut and Psychology Syndrome (GAPS) diet (10.7%, n=23). Together, these were among the most frequently reported CATs and were predominantly accessed through health professionals (vitamin/mineral: 54%; gluten/casein: 33%) or, for the GAPS diet, through the internet (40%). Median total costs ranged from approximately 1.510 TL for the GAPS diet to 3.508 TL for vitamin/mineral supplementation; typical duration was 0–3 months for all three.

Sensory and Movement-Based Interventions

This cluster includes sensory integration therapy (30.3%, n=64), music and dance interventions (6.7%, n=14), and reflexology (5.8%, n=12). Sensory integration was the second most frequently reported CAT overall and the only one with a median duration extending to 6–12 months. Special

education institutions were the dominant information source for sensory integration (39%) and special education teachers for music and dance (29%); reflexology was most often discovered through another parent (33%). Total costs were highest for reflexology (5.959 TL) and sensory integration (5.060 TL).

Table 2. Consolidated Summary of CAT Use Patterns Reported by Parents (N=210)

Therapy	n	Prevalence (%)	Primary information source (%)	Typical duration	Median total cost TL (USD eq.)	Most cited benefit
Vitamin/mineral supplements	78	37.1	Health professionals (54)	0–3 months	3.508 (≈ 292)	Attention span
Sensory integration therapy	64	30.3	Special education institutions (39)	6–12 months	5.060 (≈ 422)	Attention span
Gluten/casein diet	55	26.0	Health professionals (33)	0–3 months	3.187 (≈ 266)	Reduced repetitive behaviors
Religious-based interventions	47	22.1	Family relative (53)	0–3 months	362 (≈ 30)	Communication
Animal-assisted interventions	34	16.3	Special education institutions (32)	0–3 months	2.400 (≈ 200)	Socialization
GAPS diet	23	10.7	Internet (40)	0–3 months	1.510 (≈ 126)	Following instructions
Music and dance interventions	14	6.7	Special education teacher (29)	3–6 months	2.493 (≈ 208)	Socialization
Reflexology	12	5.8	Another parent (33)	3–12 months	5.959 (≈ 497)	Attention span
Hyperbaric oxygen therapy	11	5.3	Internet/parent (37)	0–3 months	6.909 (≈ 576)	Multiple domains
Drama therapy	7	3.4	Special education teacher (57)	3–6 months	2.140 (≈ 178)	Attention/social
Art therapy	6	2.9	Teacher/internet (33)	0–3 months	500 (≈ 42)	Positive affect
Auditory integration training	6	2.9	Another parent (50)	0–3 months	4.350 (≈ 363)	N/A
Neurofeedback	2	1.0	Another parent/internet	0–6 months	2.500 (≈ 208)	Positive affect

Not: n=subsample of parents who reported having used the therapy in question. Percentages for therapies with subsamples of n<10 (drama therapy, art therapy, auditory integration, neurofeedback) should be interpreted as descriptive only. USD equivalents were calculated using the average TL/USD exchange rate for the 2020–2021 data-collection period (≈ 1 USD=12 TL); see Method.

Cultural and Relational Interventions

This cluster includes religious-based interventions (22.1%, n=47) and animal-assisted interventions (16.3%, n=34). Religious-based interventions were predominantly accessed through family relatives (53%) — the only CAT in the dataset for which family was the dominant information source — and showed the lowest total cost across all CATs (362 TL), reflecting their community-embedded delivery. Animal-assisted interventions were accessed primarily through special education institutions (32%).

Biomedical and Technological Interventions

This cluster includes hyperbaric oxygen therapy (5.3%, n=11) and neurofeedback (1.0%, n=2). Both were accessed predominantly through online sources or other parents rather than through health or education professionals, and both involved the highest per-session costs in the dataset (hyperbaric oxygen: 800 TL or more per session for 37% of families).

Arts and Auditory-Based Interventions (Exploratory)

This cluster includes drama therapy (3.4%, n=7), art therapy (2.9%, n=6), and auditory integration training (2.9%, n=6). All three were reported by very small user subsamples and are flagged as exploratory throughout the present and subsequent sections; descriptive figures are included in Tables 2 and 3 for completeness but should not be interpreted as reliable population estimates.

Perceived Effectiveness, Side Effects, and Continuation Patterns

Table 3 presents, for each of the 13 CATs, the parent-reported combined proportion of “works” and “definitely works” ratings, the proportion of users reporting side effects, the combined proportion of “would recommend” and “would definitely recommend” ratings, and the discontinuation rate at the time of data collection. The narrative again follows the five-cluster organization to support cross-cluster comparison.

Table 3. Consolidated Summary of Perceived Outcomes, Side Effects and Continuation Patterns of CATs

Therapy	n	"Works" + "Definitely works" (%)	Side effects (%)	Would recommend (%)	Discontinued (%)
Vitamin/mineral supplements	78	53	8.0	61	47.4
Sensory integration therapy	64	73	8.3	84	49.2
Gluten/casein diet	55	57	15.4	61	53.7
Religious-based interventions	47	n.r.	7.0	n.r.	89.0
Animal-assisted interventions	34	44	0.0	56	79.0
GAPS diet	23	50	0.0	n.r.	42.9
Music and dance interventions	14	71	15.0	86	89.0
Reflexology	12	n.r.	0.0	42	75.0
Hyperbaric oxygen therapy	11	0	9.1	n.r.	100.0
Drama therapy	7	71	0.0	57	100.0
Art therapy	6	33	0.0	50	50.0
Auditory integration training	6	0	0.0	16	83.0
Neurofeedback	2	50	50.0	50	100.0

Not: n = subsample of parents who reported having used the therapy in question. "n.r." = not reported; the modal response category was "not sure" (≥ 30%) and no clear positive or negative tendency could be established. Findings for drama therapy, art therapy, auditory integration, and neurofeedback (n < 10) should be interpreted as exploratory only.

Nutrition-Based Interventions

Combined positive effectiveness ratings ("works" + "definitely works") ranged from 50% for the GAPS diet to 57% for the gluten/casein diet. The gluten/casein diet had the highest side-effect rate in the dataset (15.4%), most commonly general health problems and reduced affect. Discontinuation was substantial across all three (42.9%–53.7%), suggesting that nutrition-based interventions - despite favorable perceived effectiveness - require sustained behavioral and lifestyle modifications that families may find difficult to maintain long-term.

Sensory- and Movement-Based Interventions

Sensory integration therapy showed the highest positive effectiveness rating among CATs with subsamples of n≥10 (73%) and the highest

recommendation rate (84%), with a side-effect rate of 8.3%. Music and dance interventions also showed high positive effectiveness (71%) and recommendation rates (86%) despite a 15.0% side-effect rate. However, both showed high discontinuation rates (sensory integration: 49.2%; music and dance: 89.0%), and reflexology produced predominantly "not sure" effectiveness ratings (58%) alongside a 75.0% discontinuation rate.

Cultural and Relational Interventions

Religious-based interventions yielded predominantly "not sure" responses across both effectiveness (48%) and recommendation (36%) items, with the highest discontinuation rate in this cluster (89.0%). Animal-assisted interventions showed moderate perceived effectiveness (44%) and no reported side effects but were also discontinued at a high rate (79.0%).

Biomedical and Technological Interventions

Hyperbaric oxygen therapy was the most expensive CAT (median 6.909 TL) and showed the poorest outcome profile: no users reported "definitely works," 36% reported the therapy "did not work," and 100% of users had discontinued by the time of data collection. Neurofeedback (n=2, exploratory) showed a 100% discontinuation rate alongside a 50% side-effect rate.

Arts- and Auditory-Based Interventions (Exploratory)

Among the four CATs with subsamples of $n<10$, drama therapy reported the highest positive effectiveness rate (71%, n=7) and 0% side effects; art therapy showed mixed outcomes with 33% positive effectiveness; auditory integration training showed 0% "definitely works" ratings and 83% discontinuation. All findings in this cluster should be interpreted as exploratory only given the small subsample sizes.

Cross-Cluster Summary

A consistent pattern across all five clusters is the co-occurrence of moderate-to-high positive perceived-effectiveness ratings with high discontinuation rates: 8 of the 13 CATs showed discontinuation rates above 70%, including therapies with favorable effectiveness perceptions (e.g., sensory integration, music and dance). The most common categories of reported side effects across all CATs were sleep disturbances, aggression, and reduced affect. This pattern is interpreted further in the Discussion.

Associations Among Variables

Chi-square tests of independence were conducted to examine associations between parental demographic characteristics and CAT use, as well as between pairs of CATs. The expected-cell-frequency assumption (≥ 5 in at least 80% of cells) was met for all reported analyses. All effect sizes are reported as φ for 2 × 2 tables.

A moderate, statistically significant association was observed between parental age category and the number of CATs reported ($\chi^2(4, N=210)=15.78$, $p=.003$, $\varphi=.345$). Parents in older age categories tended to report a greater number of distinct CATs used over time.

A moderate association was observed between use of the gluten/casein diet and use of vitamin/mineral supplementation ($\chi^2(1, N=210)=17.89$, $p<.001$, $\varphi=.292$). Low-magnitude but statistically significant associations were observed between the gluten/casein diet and animal-assisted interventions ($\chi^2(1, N=210)=7.21$, $p=.007$, $\varphi=.185$), between sensory integration therapy and animal-assisted interventions ($\chi^2(1, N=210)=5.25$, $p=.022$, $\varphi=.158$), between vitamin/mineral supplementation and animal-assisted interventions ($\chi^2(1, N=210)=10.58$, $p=.001$, $\varphi=.224$), and between vitamin/mineral supplementation and music and dance interventions ($\chi^2(1, N=210)=7.61$, $p=.006$, $\varphi=.190$). The complete pattern of statistically significant associations is presented in Table 4.

Table 4. Statistically Significant Associations Between Demographic Variables and CAT Use

Variable pair	χ^2 (df)	N	p	φ	Magnitude
Parental age × Number of CATs used	15.78 (4)	210	.003	.345	Moderate
Gluten/casein × Vitamin/mineral	17.89 (1)	210	< .001	.292	Moderate
Vitamin/mineral × Animal-assisted	10.58 (1)	210	.001	.224	Small–moderate
Vitamin/mineral × Music and dance	7.61 (1)	210	.006	.190	Small
Gluten/casein × Animal-assisted	7.21 (1)	210	.007	.185	Small
Sensory integration × Animal-assisted	5.25 (1)	210	.022	.158	Small

Not: All reported analyses satisfied the assumption that expected cell frequencies equal or exceed 5 in at least 80% of cells. φ = phi coefficient. Effect-size magnitudes were interpreted following Cohen (1988): small ≈ .10, medium ≈ .30, large ≈ .50 for 2 × 2 tables.

Discussion

This cross-sectional descriptive survey aimed to provide foundational national-level data on the use of complementary and alternative therapies (CATs) among families of children with autism spectrum disorder (ASD) in Türkiye. The discussion is organized around six interpretive themes that follow the analytic structure of the Results section: prevalence in cross-cultural context; the pattern of high use combined with high discontinuation; information sources; co-occurrence patterns among CATs; the parental-age association; and the conceptual distinction between perceived and measured outcomes. Throughout, interpretive claims are restricted to what the descriptive design and parental self-report data can support, and inferences regarding clinical effectiveness are explicitly avoided.

Prevalence of CAT Use Among Turkish Families: Patterns in International Context

The finding that 73.3% of participating families had used at least one CAT, and that 16.6% had used four or more, is consistent with the high CAT-use rates documented across pediatric populations in recent international research (Adams et al., 2014; Guilcher et al., 2025; Leach et al., 2024) and within the ASD literature specifically (Goin-Kochel et al., 2009; Hanson et al., 2007; Perrin et al., 2012). The three most frequently reported CATs in the present sample — vitamin/mineral supplementation, sensory integration therapy, and the gluten/casein diet — also align closely with the dominant categories reported in non-Turkish samples. The convergence between Turkish and international patterns suggests that parental engagement with supplementary interventions is shaped, at least in part, by features of ASD itself — its clinical heterogeneity, the absence of curative treatment, and the typically incremental nature of gains from established interventions — rather than by context-specific factors alone.

At the same time, the present findings contribute culturally specific information that is currently underrepresented in the international literature. The prevalence of religious-based interventions (22.1%) and the central role of family relatives as information sources for these interventions point to the persistence of culturally embedded health practices within Turkish families, a pattern that is less prominent in samples from Western European or North American contexts. Similarly, the prominence of special education and rehabilitation institutions as information sources for sensory integration and animal-assisted interventions reflects the structure of ASD service delivery

in Türkiye, in which private and state-supported special education centers occupy a central position in the family's intervention pathway. These observations underscore the value of context-specific descriptive evidence for designing culturally informed family-support and professional-training programs.

The Pattern of High Use Combined With High Discontinuation

A central pattern in the findings is the co-occurrence of high prevalence of CAT use with consistently high discontinuation rates: 8 of the 13 included CATs showed discontinuation rates above 70%. Notably, this pattern was not confined to therapies with low perceived-effectiveness ratings; even therapies with positive perceived effectiveness showed substantial discontinuation (e.g., sensory integration therapy: 49.2% discontinued despite 73% of users rating it as "works" or "definitely works"; music and dance interventions: 89% discontinued despite 71% positive effectiveness ratings).

This pattern is consistent with the trial-and-error model of intervention engagement described in the international ASD literature (Bourque and Fielder, 2003; Goin-Kochel et al., 2009; Hanson et al., 2007), in which families sequentially engage a series of interventions in response to ASD's clinical heterogeneity and the absence of any universally effective treatment. The present data extend this model by suggesting that, in the Turkish context, three non-mutually-exclusive factors may contribute to discontinuation. First, financial sustainability appears relevant: the two CATs with the highest reported per-session and total costs (hyperbaric oxygen therapy and reflexology) also showed among the highest discontinuation rates. Second, the practical demands of adherence appear relevant for dietary CATs: the gluten/casein and GAPS diets — which require sustained behavioral and lifestyle modifications across the family system — showed high discontinuation despite favorable perceived-effectiveness ratings among continuing users. Third, the gap between early perceived benefits and eventual discontinuation suggests that initial perceived gains may not consolidate into durable family-rated outcomes over time. These three considerations are offered as post hoc hypotheses generated from the present descriptive findings and should be tested directly in subsequent longitudinal research.

Information Sources and the Role of Networks

The findings indicate that parental information sources vary systematically by CAT type, with health professionals dominant for nutrition-based interventions (gluten/casein diet, vitamin/mineral supplementation), special education institutions dominant for sensory- and animal-based interventions, family relatives dominant for religious-based interventions, and online sources dominant for less mainstream practices (GAPS diet, hyperbaric oxygen therapy). This pattern is broadly consistent with the international literature on parental information-seeking in ASD, which has emphasized the joint influence of formal professional channels and informal social networks (Goin-Kochel et al., 2009; Hanson et al., 2007).

Of particular note is the centrality of health professionals as the dominant source of information for the gluten/casein diet (33%) and vitamin/mineral supplementation (54%). Both interventions have been classified as having limited or insufficient empirical support for ASD by major evidence reviews (NAC, 2015; Wong et al., 2015). This finding points to a potential focus area for professional-development initiatives in Türkiye: supporting health and special education professionals in maintaining current knowledge of the EBP framework and in communicating evidence-status information to families in a non-judgmental, supportive manner.

Co-Occurrence of CATs: Indications of Family-Level Intervention Profiles

The chi-square analyses identified statistically significant associations among CATs that may reflect distinct family-level intervention profiles. The moderate association between the gluten/casein diet and vitamin/mineral supplementation (φ=.292) suggests that families pursuing nutrition- or biomedical-oriented framings of ASD tend to combine multiple nutritional approaches — a pattern consistent with the "biomedical orientation" cluster documented in the international ASD literature. The smaller positive associations linking animal-assisted interventions to sensory integration, vitamin/mineral supplementation, and the gluten/casein diet suggest that animal-assisted approaches may operate as complements to, rather than substitutes for, other intervention pathways within family practice.

These observations are derived from bivariate associations and should be regarded as exploratory. Subsequent research employing multivariate

methods on larger samples — for example, latent class analysis of CAT-use patterns — could test directly whether discrete family-level CAT profiles can be identified empirically.

The Association Between Parental Age and the Number of CATs Used

The moderate association between parental age category and the number of CATs reported (φ=.345) is consistent with two non-mutually-exclusive interpretations. First, parents in older age categories are more likely to have a longer history of intervention-seeking, in part because their child is more likely to have lived longer with the diagnosis; the number of CATs reported thus partly reflects cumulative exposure across the child's developmental trajectory. Second, older parents may have accumulated greater financial resources, broader social networks, and more practical experience in navigating the special education and health systems, all of which could lower the threshold for engaging additional interventions over time. These interpretations are speculative within the limits of a cross-sectional descriptive design and should be tested directly through longitudinal research.

Distinguishing Perceived from Measured Outcomes

A central methodological note must be emphasized in interpreting these findings. The data presented here capture parents' subjective experiences of CAT use — their perceptions of effectiveness, their reasons for discontinuation, and their willingness to recommend — rather than objectively measured clinical outcomes. Subjective perceived effectiveness is a legitimate and substantively important construct in service-utilization research, because it shapes future intervention decisions, family resource allocation, and information-sharing within social networks. However, perceived effectiveness is conceptually and empirically distinct from intervention effectiveness as established through controlled experimental research. The findings of the present study should therefore be read as a description of how Turkish families engage with and evaluate CATs, and not as an evaluation of whether the included CATs are effective for individuals with ASD. The empirical-status classifications of these therapies remain those established by major evidence reviews (Hume et al., 2021; NAC, 2015; Steinbrenner et al., 2020; Wong et al., 2015), which — as discussed in the Method section with regard to the specific case of sensory integration — are not displaced by the parental-report data reported here.

Limitations

Several limitations should be considered when interpreting the present findings. First, the cross-sectional descriptive design and the reliance on parental self-report preclude inferences about intervention effectiveness, causality, or temporal change in CAT use. Second, convenience sampling through social media and special education institutions may have favored participation by digitally engaged parents and those already affiliated with formal services. Third, although parents reported the type of institution that issued the ASD diagnosis, formal clinical confirmation of diagnoses was not performed within the present design. Fourth, while the data-collection instrument was developed through a multi-phase process including stakeholder consultation, expert content review, and pilot testing, a quantitative content validity index was not computed. Fifth, recall bias may affect retrospective parental reports. Sixth, several CATs were reported by very small user subsamples ($n<10$), and findings for these therapies should be regarded as exploratory. Seventh, monetary values are reported at the average 2020–2021 exchange rate; cross-temporal cost comparisons should be made with caution.

Future Research

The present findings indicate several priority directions for subsequent research on CAT use in ASD. Qualitative studies are needed to deepen understanding of the motivations, decision-making processes, and meaning-making practices that underlie parental engagement with specific CAT categories, particularly with culturally embedded interventions such as religious-based practices. Longitudinal designs are needed to test the trial-and-error model directly. Multivariate methods such as latent class analysis can be used to test empirically whether discrete family-level CAT profiles emerge. Finally, intervention research is needed to evaluate the effectiveness of professional-development and family-and-professional training programs designed to support evidence-informed communication regarding CAT engagement.

Conclusion

This cross-sectional descriptive survey provides foundational national-level data on parental engagement with CATs among families of children with ASD in Türkiye. The findings document a high prevalence of CAT use (73.3%), a strong concentration of use within three therapies (vitamin/mineral supplementation, sensory integration therapy, and the

gluten/casein diet), systematic variation in information sources by therapy type, and a pattern of high discontinuation across the majority of included CATs. A moderate association between parental age and the number of CATs used was also observed, alongside statistically significant co-occurrence patterns among nutrition- and sensory-based interventions.

Interpreted within the limits of a descriptive design based on parental self-report, the findings point toward several directions for subsequent work. For research, they identify priority targets for cross-cultural comparative studies, longitudinal investigations of the trajectory of CAT engagement across the child's development, and multivariate analyses of family-level intervention profiles. For practice, they highlight the value of professional-development initiatives that support special education and health professionals in maintaining current knowledge of EBP classifications and in engaging in evidence-informed communication with families. For policy, the findings support continued investment in accessible, evidence-based services and in family-and-professional training programs that can reduce reliance on extended trial-and-error sequences of CAT engagement. Across all three domains, the findings suggest that the goal is not to discourage parental engagement with the broader intervention landscape, but to ensure that this engagement is well-informed, financially sustainable, and well-aligned with the available empirical evidence base.

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