JKSCI

한국컴퓨터정보학회논문지
Journal of The Korea Society of Computer and Information
Vol. 31 No. 7, pp. 179-194, July 2026
https://doi.org/10.9708/jksci.2026.31.07.179

Effects of Parent-centered Psychosocial Interventions on Stress and Depression in Parents of Children with Autism Spectrum Disorder: A Systematic Review and Meta-Analysis

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[Abstract]

Parents of children with autism spectrum disorder (ASD) frequently experience high levels of stress and depression. This study aimed to evaluate the effects of psychosocial interventions for these parents through a systematic review and meta-analysis. Randomized controlled trials (RCTs) published up to January 2026 were identified through searches of PubMed, CINAHL, Embase, Cochrane Library, RISS, KISS, and ScienceON. A total of 869 records were identified, of which 15 studies met the inclusion criteria. Psychosocial interventions significantly reduced stress (ES = −1.14, 95% CI: −1.67 to −0.62, I^2 = 90%, $p < .001$) and depression (ES = −0.88, 95% CI: −1.31 to −0.45, I^2 = 88%, $p < .001$). Cognitive behavioral therapy and hybrid-format interventions were associated with relatively larger effect sizes; however, these subgroup findings should be interpreted cautiously because of the limited number of studies and high heterogeneity. These findings support integrating psychosocial support into family-centered ASD care and underscore the need for further high-quality studies on comparative effectiveness and long-term outcomes.

▸ **Key words**: Autism spectrum disorder, Parents, Psychosocial intervention, Stress, Depression

[요 약]

자폐스펙트럼장애(ASD) 아동의 부모는 높은 수준의 스트레스와 우울을 경험하는 경우가 많다. 본 연구는 이들 부모를 대상으로 한 심리사회적 중재의 효과를 체계적 문헌고찰 및 메타분석을 통해 평가하고자 하였다. 2026년 1월까지 발표된 무작위 대조군 연구를 대상으로 PubMed, CINAHL, Embase, Cochrane Library, RISS, KISS 및 ScienceON을 검색하였다. 총 869편의 문헌이 검색되었으며, 이 중 선정기준을 충족한 15편의 연구가 최종 분석에 포함되었다. 메타분석 결과, 심리사회적 중재는 스트레스(ES = −1.14, 95% CI: −1.67~−0.62, I^2 = 90%, $p < .001$)와 우울(ES = −0.88, 95% CI: −1.31~−0.45, I^2 = 88%, $p < .001$)을 유의하게 감소시키는 것으로 나타났다. 인지행동치료와 하이브리드 방식의 중재는 상대적으로 큰 효과크기를 보였으나, 하위군 분석은 포함 연구 수가 제한적이고 연구 간 이질성이 높아 신중한 해석이 필요하다. 본 연구 결과는 ASD 아동을 위한 가족중심 돌봄에 심리사회적 지원을 통합할 필요성을 뒷받침하며, 심리사회적 중재의 상대적 효과와 장기적 효과를 규명하기 위한 추가적인 고품질 연구의 필요성을 시사한다.

▸ **주제어**: 자폐스펙트럼장애, 부모, 심리사회적 중재, 스트레스, 우울

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• Received: 2026. 05. 20, Revised: 2026. 07. 06, Accepted: 2026. 07. 13.

http://www.ksci.re.kr pISSN:1598-849X | eISSN:2383-9945

I. Introduction

The World Health Organization estimates the global prevalence of autism spectrum disorder (ASD) to be approximately 1 in 100 children[1]. However, the prevalence of ASD has shown a steady increase worldwide. According to the Centers for Disease Control and Prevention, the prevalence of ASD among 8-year-old children in the United States has increased from approximately 1 in 44 children to 1 in 31 children in recent years[2]. In South Korea, data from the Health Insurance Review and Assessment Service indicated that 20,957 individuals received treatment for ASD in 2023, representing an approximately 85% increase over the past five years[3]. This increase may reflect not only a true rise in incidence but also changes in diagnostic criteria, expanded early screening, and increased public awareness of ASD.

ASD is a neurodevelopmental disorder characterized by persistent deficits in social communication and interaction, along with restricted and repetitive patterns of behavior and interests. The term “spectrum” reflects the considerable variability in symptom presentation, severity, and functional level among affected individuals[4]. Rather than relying on a single curative treatment, ASD requires a multidisciplinary approach aimed at symptom management and functional improvement. Recommended interventions include behavioral interventions, developmental and educational approaches, parent-mediated interventions, family support, and pharmacological treatment when necessary[5]. Because children with ASD often require ongoing support in daily life, parents play critical roles as both caregivers and active participants in intervention processes. Consequently, parents of children with ASD frequently experience substantial psychological and social burdens. They must cope with accepting the diagnosis, managing behavioral and communication difficulties, seeking treatment and educational resources, addressing financial strain, and facing uncertainty regarding their child’s future[6]. These burdens affect not only individual parents but also overall family functioning and constitute major risk factors for compromised parental mental health. In particular, stress and depression have been identified as prominent mental health concerns among parents of children with ASD. Previous studies have reported that parents of children with ASD experience significantly higher levels of stress than parents of typically developing children[7], and approximately 45% report depressive symptoms[8]. Such psychological difficulties may negatively affect parent-child interactions as well as participation and adherence to intervention programs[9].

To address these challenges, a variety of psychosocial interventions for parents of children with ASD have been developed. These include psychoeducation, cognitive behavioral therapy (CBT), mindfulness-based interventions (MBI), acceptance and commitment therapy (ACT), and parent support programs. Previous systematic reviews and meta-analyses have suggested that these interventions may reduce parental psychological distress[10]. Nevertheless, inconsistencies remain due to variations in intervention types, participant characteristics, study designs, and outcome measures. In particular, some studies focused only on parents of children within specific age groups or exclusively on mothers[11], while others examined parental mental health broadly without separately analyzing stress and depression[12]. Previous meta-analyses frequently included parent-mediated interventions (PMIs), in which parents delivered interventions to their children, making it difficult to independently evaluate the effects of psychosocial interventions specifically designed to improve parents' own mental health. In addition, evidence synthesized exclusively from randomized controlled trials (RCTs) has been limited, and few studies have systematically compared intervention effects

according to intervention type, delivery format, and intervention duration.

To address these limitations, the present study included only parent-centered psychosocial interventions targeting parents of children with ASD and conducted a systematic review and meta-analysis of randomized controlled trials. Furthermore, stress and depression were analyzed separately as the primary outcomes, and subgroup analyses were performed according to intervention type, delivery format, intervention duration, and stress type to provide a more comprehensive evaluation of the effects of psychosocial interventions. Through this approach, the present study sought to provide evidence on the effectiveness of psychosocial interventions for promoting the mental health of parents of children with ASD and to inform the development of future clinical and community-based parent support programs.

II. Preliminaries

Psychosocial interventions for parents of children with ASD have been implemented using a variety of approaches, including CBT, ACT, MBI, and psychoeducation. These interventions are grounded in distinct theoretical frameworks and mechanisms of action, each contributing to the reduction of parental stress and depression in different ways.

CBT is a structured therapeutic approach aimed at alleviating psychological symptoms by modifying maladaptive thoughts and behaviors that maintain emotional difficulties. Based on cognitive theory, CBT posits that automatic thoughts, beliefs, and cognitive distortions influence individuals' emotions and behaviors. Accordingly, therapeutic techniques such as cognitive restructuring, problem-solving skills training, and behavioral activation are used to promote more adaptive cognitive and behavioral patterns[13]. CBT-based interventions for parents of children with ASD primarily focus on reframing cognitive interpretations of stressful parenting experiences and strengthening systematic coping strategies for managing children's behavioral difficulties. In particular, CBT may reduce stress and depressive symptoms by modifying parents' negative automatic thoughts (e.g., "I am not a good parent") and facilitating the development of more realistic and functional thinking patterns. For this reason, CBT is considered one of the most representative psychotherapeutic interventions for directly improving the mental health of parents of children with ASD[14].

ACT is a form of third-wave CBT that emphasizes the enhancement of psychological flexibility as its central goal. Rather than attempting to eliminate or modify negative thoughts and emotions, ACT encourages individuals to accept these experiences as they are while maintaining present-moment awareness and engaging in behaviors consistent with personal values. Core therapeutic processes include acceptance, cognitive defusion, values clarification, and committed action[15]. Parents of children with ASD often experience chronic stress and emotional distress associated with their child's developmental challenges and long-term caregiving demands. ACT-based interventions help parents accept such distress rather than avoid it and encourage them to continue acting in accordance with personally meaningful values, such as maintaining supportive parent-child relationships and fulfilling parenting roles. Through this process, parents may develop greater flexibility in coping with stressful situations, leading not only to reductions in depression and anxiety but also to improvements in parenting efficacy[16].

MBIs are interventions based on mindfulness, defined as nonjudgmental attention to present-moment experiences. This approach aims to reduce emotional reactivity and enhance self-regulation by encouraging individuals to

observe their thoughts, emotions, and bodily sensations without automatically reacting to them. Representative programs include Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy, which incorporate techniques such as meditation, breathing exercises, and body scan practices[17]. For parents of children with ASD, MBI may be effective in alleviating parenting-related stress and emotional overload. Rather than responding automatically and emotionally to their child's behaviors, parents are encouraged to become aware of the present situation and respond more intentionally. Such processes contribute to stress reduction and emotional stability and may also improve the quality of parent-child interactions[18].

Psychoeducation is an educational intervention designed to enhance individuals' understanding of a specific condition or situation and to improve adaptive coping abilities through the provision of information. Compared with psychotherapeutic approaches, psychoeducation is more educational in nature and focuses on delivering systematic information regarding disease characteristics, symptoms, treatment methods, and daily management strategies. It may also include components that facilitate peer experience sharing and social support[19]. Psychoeducational interventions for parents of children with ASD aim to increase understanding of ASD characteristics and developmental trajectories while providing guidance on behavioral management strategies and service utilization. Through these interventions, parents may gain a more accurate understanding of their child's behaviors and apply more effective parenting strategies. Although psychoeducation may have limited direct psychotherapeutic effects, it plays an important foundational role in reducing parental uncertainty and anxiety while enhancing parenting confidence[20].

Taken together, psychosocial interventions identified in previous studies differ in their theoretical foundations and scopes of application and may be implemented in various ways depending on parental psychological needs and family circumstances. Furthermore, some studies have suggested the potential value of multicomponent interventions that integrate multiple therapeutic approaches rather than relying on a single modality. These findings support the need for a comprehensive evaluation of psychosocial interventions for parents of children with ASD and for systematic comparisons of intervention characteristics and effectiveness across intervention types.

III. Research Methods

1. Eligibility Criteria

The eligibility criteria were established according to the PICOS framework (Participants, Interventions, Comparators, Outcomes, and Study Design). Participants included parents or primary caregivers of children or adolescents diagnosed with ASD. Interventions were defined as parent-centered psychosocial interventions aimed at improving parental mental health. Parent-mediated interventions primarily targeting children's developmental or behavioral outcomes were excluded. Comparators included usual care, waitlist control, or no intervention. The primary outcomes were stress (including parenting stress and general stress) and depression. Given the limited number of randomized controlled trials assessing parenting stress specifically, parenting stress and general stress were combined into a single stress category to enhance comprehensiveness and statistical power. Only RCTs were included. Eligible studies were limited to full-text publications available in English or Korean. Peer-reviewed journal articles were primarily eligible for inclusion. Online-first articles were included only if they had undergone peer review and had been assigned an official DOI or publication record by January 2026. Preprints that

had not undergone peer review were excluded. In addition, one doctoral dissertation was included as gray literature because it met all predefined PICOS eligibility criteria, reported a randomized controlled trial, and provided sufficient quantitative data for the meta-analysis. The following studies were excluded: (1) studies focusing solely on child outcomes without targeting parental mental health; (2) studies evaluating only pharmacological or medical interventions without psychosocial components; (3) studies with insufficient quantitative data for meta-analysis; (4) studies without accessible full texts; and (5) studies without control groups, nonrandomized studies, or quasi-experimental studies.

2. Literature Search and Data Extraction

A systematic literature search was conducted from February to March 2026 for studies published up to January 2026, without restrictions on publication year. The following electronic databases were searched: PubMed, CINAHL, Cochrane Library, Embase, RISS (Research Information Sharing Service), KISS (Korean Studies Information Service System), and ScienceON. To improve search sensitivity and specificity, preliminary searches were conducted to identify and apply relevant MeSH and Emtree terms. Non-MeSH and non-Emtree terms were searched as free-text keywords within titles, abstracts, and keyword fields. Search terms included “autism spectrum disorder” “parents” “psychotherapy” “cognitive behavioral therapy” “acceptance and commitment therapy” “mindfulness” “psychoeducation” “stress” “depression” and “randomized controlled trial” combined using Boolean operators (AND, OR). The detailed search strategies for each database, including the search platform, search date, search strings, Boolean operators, field tags, and search limits, are provided in Supplementary Appendix S1.

Data extraction was performed using a standardized data extraction form developed after preliminary review to ensure consistency and reliability. Extracted information included authors and publication year, country of study, study design, participant characteristics (age, sex, and sample size), intervention characteristics (intervention type, delivery format, duration, frequency, total number of sessions, and session length), and outcome variables and measurement instruments.

3. Data Analysis

Statistical analyses of intervention effect sizes and heterogeneity across studies were conducted using Review Manager (RevMan) version 5.3 software from the Cochrane Collaboration. Standardized mean differences (SMDs) were calculated to compare intervention effects on stress and depression across studies. Statistical heterogeneity was assessed using Higgins’ I^2 statistic. Considering potential clinical and methodological heterogeneity, pooled effect sizes were estimated using a random-effects model.

Subgroup analyses were conducted to identify factors influencing intervention effectiveness. Prespecified subgroup analyses were based on intervention type, delivery format, and intervention duration. Intervention duration was categorized for comparability across studies as follows: short (<8 weeks), medium (8–11 weeks), and long (≥12 weeks). Although parenting stress and general stress are conceptually distinct constructs, both are recognized as important dimensions of parental psychological stress[21]. Therefore, they were synthesized into a broader stress outcome to evaluate the overall effects of psychosocial interventions. To examine whether conceptual differences between these two constructs influenced intervention effects, subgroup analyses were conducted according to stress type (parenting stress vs. general stress).

Statistical significance was evaluated using overall effect estimates and 95% confidence intervals (CIs), with a significance level set at $p < .05$. Effect sizes were interpreted according to

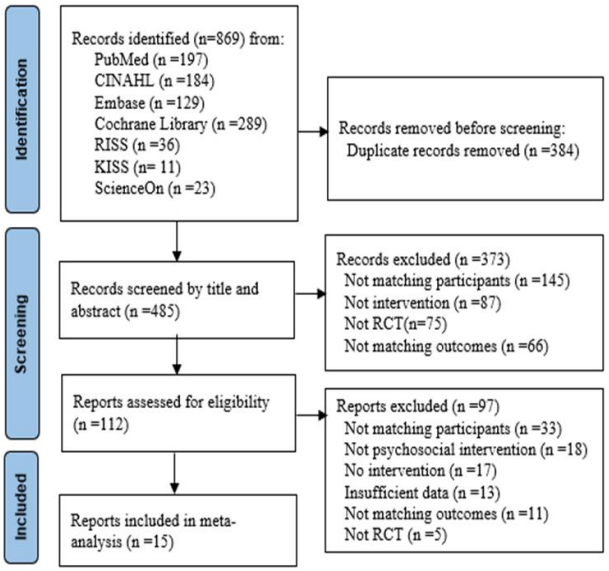


Fig. 1. Flow Diagram of Study Selection

Cohen's criteria[22], where SMDs of 0.20–0.49 indicated small effects, 0.50–0.79 indicated moderate effects, and ≥0.80 indicated large effects. Publication bias was assessed through visual inspection of funnel plots.

4. Risk of Bias Assessment

Risk of bias was assessed using the Cochrane Risk of Bias tool version 1.0 (RoB 1.0). The tool evaluates the following domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. Each domain was rated as low risk, high risk, or unclear risk of bias. Risk of bias assessments were conducted independently by two reviewers, and discrepancies were resolved through discussion and consensus.

IV. Results

1. Literature selection

The study selection process is presented in Figure 1. A total of 869 records were identified through database searches. After removing 384 duplicate records, 485 studies remained for screening. Following title and abstract review, 112 studies were initially selected for full-text assessment. Based on the predefined inclusion and exclusion criteria, 15 studies were ultimately included in the meta-analysis.

2. Characteristics of the included studies

The characteristics of the 15 included studies conducted across eight countries are presented in Table 1. Studies conducted in the United States were the most common, accounting for six studies (40.0%). Except for three studies, most were published after 2020. The mean age of children with ASD was 7.9 ± 3.7 years, and the mean age of parents was 38.4 ± 4.8 years. The total sample size was 1,016 participants, including 501 in the intervention groups and 515 in the control groups.

Regarding intervention type, MBI, CBT, and psychoeducation were the most frequently implemented interventions, each represented in four studies (26.7%), followed by ACT in three studies (20.0%). In terms of delivery format, offline interventions were the most common, comprising 10 studies (66.7%), whereas four studies (26.7%) used a hybrid format combining offline and online approaches. Session duration ranged from 40 to 120 minutes, and the number of sessions varied from 2 to 18. Total intervention duration ranged from 1 to 20 weeks.

For stress assessment, the Parenting Stress Index (PSI) was the most frequently used instrument, appearing in five studies (33.3%). For depression assessment, the Depression Anxiety Stress Scale (DASS) was the most commonly used measure, appearing in four studies (26.7%).

3. Effects of psychosocial intervention

The pooled effect sizes of the interventions are presented in Figure 2, and the subgroup analysis results are summarized in Table 2. A total of 10 studies evaluated intervention effects on stress reduction. The pooled effect size was ES = −1.14 (95% CI: −1.67 to −0.62, $p < .001$), indicating a large

Table 1. Characteristics of Included Studies

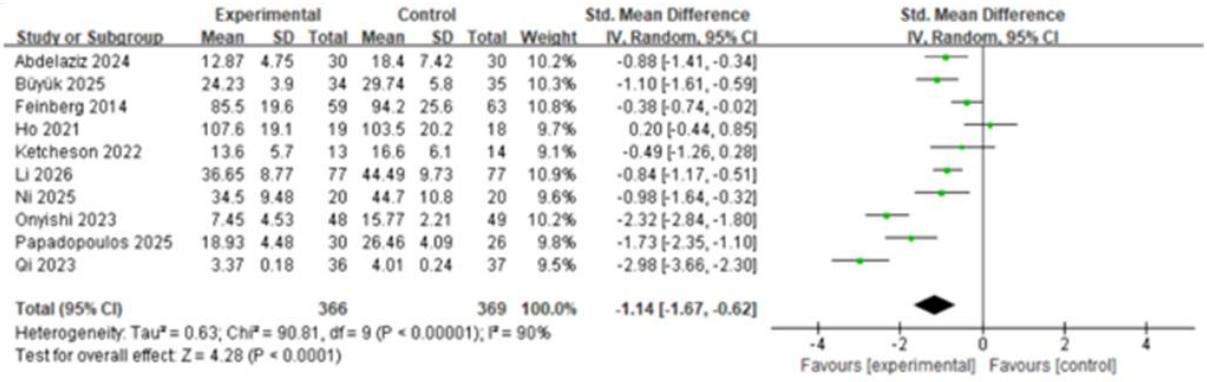
First author and year	Country	Participants				Intervention				Outcomes	Measures
		Child age	Mean age	Female (%)	No. (IG, CG)	Type	Format	Duration	Total duration, session, Fre, Min		
Abdelaziz 2024[23]	Saudi Arabia	4~12	34.80	100	60 (30, 30)	CBT	Offline	Long	12wk, 12, 1/wk, 90	GS, depression	DASS
Abid 2024[24]	Tunisia	3~8	37.1	79	62 (31, 31)	PE	Hybrid	Long	20wk, 8, NM, 120	Depression	HADS
Büyük 2025[25]	Türkiye	9.3	38.8	100	69 (34, 35)	PE	Offline	Short	4~6wk, 6, NM, 45	GS	PSS
DaWalt 2018[26]	USA	14-17	NM	87.9	41 (16, 25)	PE	Offline	Medium	8wk, 8, 1/wk, 60~90	Depression	CESD
Feinberg 2014[27]	USA	2.8	33.5	100	122 (59, 63)	CBT	Offline	Short	6~8wk, 6, NM, 30~45	PS, depression	PSI, QIDS
Hahs 2019[28]	USA	8.44	45.5	72.2	18 (9, 9)	ACT	Offline	Short	1wk, 2, 2/wk, 120	Depression	BDI-II
Ho 2021[29]	Hong Kong	13	46.5	76.0	37 (19, 18)	MBI	Offline	Medium	9wk, 9, 1/wk, 90	PS	PSI
Ketcheson 2022[17]	USA	2~5	36.4	92.6	27 (13, 14)	MBI	Offline	Long	12wk, 12, 1/wk, 60	GS, depression	DASS
Kuhlthau 2020[30]	USA	2~17	45	96.1	51 (25, 26)	MBI	Online	Medium	8wk, 8, 1/wk, 90	depression	PHQ
Li 2026[31]	Iran	5.6	36.5	87.6	154 (77, 77)	ACT	Hybrid	Medium	8wk, 8, 1/wk, 120	PS, depression	PSI, PHQ
Ni 2025[32]	Hong Kong	5.9	35.7	87.5	40 (20, 20)	ACT	Hybrid	Medium	8wk, 8, 1/wk, 120	PS, depression	PSI, PHQ
Onyishi 2023[33]	Nigeria	NM	40.9	68	97 (48, 49)	CBT	Offline	Long	12wk, 12, 1/wk, 120	GS, depression	DASS
Papadopoulos 2025[34]	Greece	10.5	40.6	66	56 (30, 26)	MBI	Offline	Medium	8wk, 8, 1/wk, 120	GS, depression	DASS
Qi 2023[35]	China	NM	20~40	54.7	73 (36, 37)	CBT	Hybrid	Short	7wk, 14, 2/wk, 40	PS	PSI
Yu 2024[36]	USA	5.2	36.9	100	109 (54, 55)	PE	Offline	Long	14wk, 14, 1/wk, NM	PS, depression	CESD

ACT = Acceptance and Commitment Therapy, BDI-II = Beck Depression Inventory-II, CBT = Cognitive Behavioral Therapy, CES-D = Center for Epidemiologic Studies Depression Scale, DASS = Depression Anxiety Stress Scales, HADS = Hospital Anxiety and Depression Scale, GS = General Stress, MBI = Mindfulness-Based Intervention, PE = Psychoeducation, PHQ = Patient Health Questionnaire, PS = Parenting Stress, PSI = Parenting Stress Index, PSS = Perceived Stress Scale, QIDS = Quick Inventory of Depressive Symptomatology

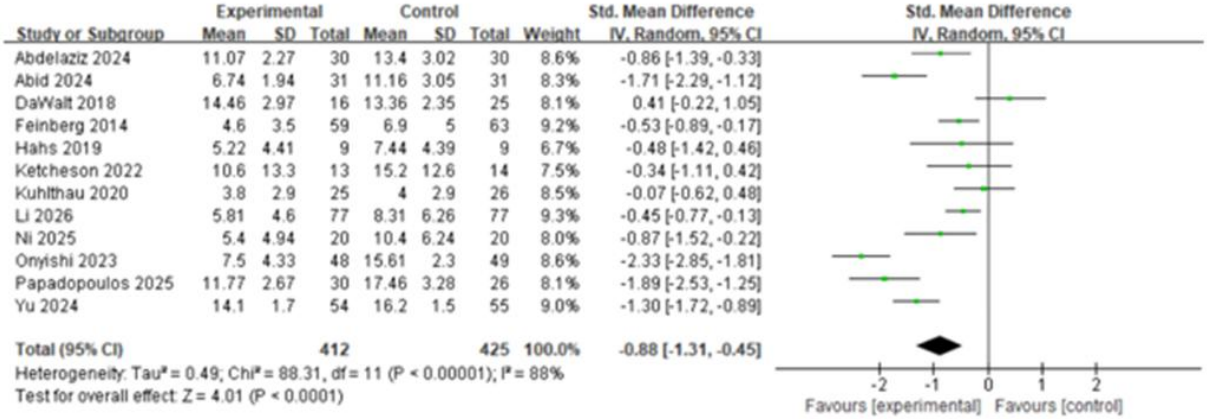
Table 2. Subgroup meta-analysis of anxiety

Categories		Stress				Depression			
		ES	95% CI	N	I^2 (%)	ES	95% CI	N	I^2 (%)
Intervention type	ACT	-0.87	-1.17, -0.58	2	0	-0.53	-0.80, -0.25	3	0
	CBT	-1.62	-2.80, -0.44	4	95	-1.23	-2.30, -0.16	3	94
	MBI	-0.68	-1.85, 0.50	3	89	-0.77	-1.92, 0.39	3	90
	PE	-1.10	-1.61, -0.59	1	-	-0.88	-2.02, 0.26	3	92
Delivery format	Offline	-0.96	-1.59, -0.34	7	89	-0.93	-1.52, -0.34	8	89
	Hybrid	-1.58	-2.83, -0.33	3	94	-0.99	-1.76, -0.21	3	85
	Online	-	-	-	-	-0.07	-0.62, 0.48	1	-
Duration (week)	Short	-1.46	-2.82, -0.10	3	96	-0.52	-0.86, -0.18	2	0
	Medium	-0.84	-1.51, -0.17	4	83	-0.56	-1.22, 0.09	5	87
	Long	-1.25	-2.37, -0.13	4	91	-1.33	-1.94, -0.73	5	84
Stress type	Parenting stress	-0.98	-1.79, -0.17	5	93	-	-	-	-
	General stress	-1.32	-1.95, -0.70	5	83	-	-	-	-

ACT = Acceptance and Commitment Therapy; CBT = Cognitive Behavioral Therapy; MBI = Mindfulness-Based Intervention; PE = Psychoeducation

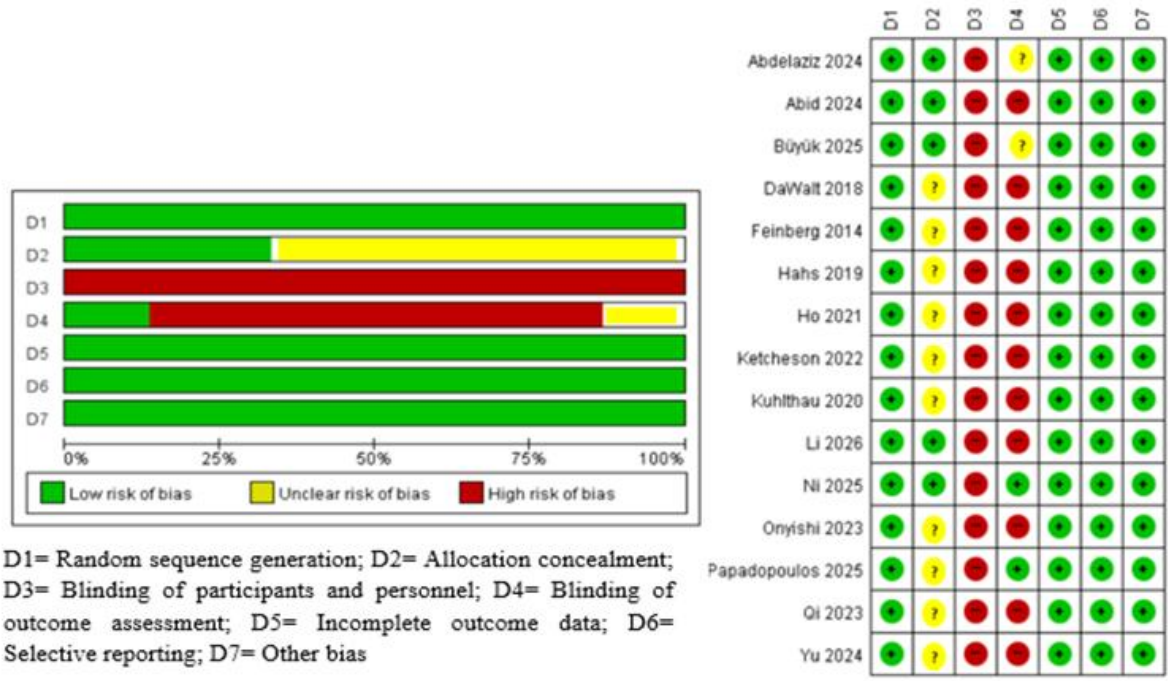


(A) Stress



(B) Depression

Fig. 2. Forest Plot of the Effects of Psychosocial Intervention



D1= Random sequence generation; D2= Allocation concealment; D3= Blinding of participants and personnel; D4= Blinding of outcome assessment; D5= Incomplete outcome data; D6= Selective reporting; D7= Other bias

Fig. 3. Assessment of Risk of Bias

effect according to Cohen's criteria[22]. This finding suggests that psychosocial interventions had substantial effects on reducing parental stress. However, substantial heterogeneity was observed across studies (I^2 = 90%), and subgroup analyses were therefore conducted to explore potential moderating factors.

According to intervention type, significant effects were identified for ACT (ES = −0.87, 95% CI: −1.17 to −0.58), CBT (ES = −1.62, 95% CI: −2.80 to −0.44), and psychoeducation (ES = −1.10, 95% CI: −1.61 to −0.59), whereas MBI did not demonstrate statistically significant effects. In the analysis according to delivery format, both offline interventions (ES = −0.96, 95% CI: −1.59 to −0.34) and hybrid interventions (ES = −1.58, 95% CI: -2.83 to −0.33) showed statistically significant effects. Regarding intervention duration, significant large effects were observed in short-term (ES = −1.46, 95% CI: −2.82 to −0.10), medium-term (ES = −0.84, 95% CI: −1.51 to −0.17), and long-term interventions (ES = −1.25, 95% CI: −2.37 to −0.13). Subgroup analyses according to stress type demonstrated significant large effects for both parenting stress (ES = −0.98, 95% CI: −1.79 to −0.17) and general stress (ES = −1.32, 95% CI: −1.95 to −0.70). Visual inspection of the funnel plot suggested a low likelihood of publication bias.

A total of 12 studies examined intervention effects on depression. The pooled effect size was ES = −0.88 (95% CI: −1.31 to −0.45, $p < .001$), indicating a large effect size and suggesting that psychosocial interventions significantly reduced parental depression. Considerable heterogeneity was also observed among studies (I^2 = 88%), and subgroup analyses were conducted to further investigate potential sources of heterogeneity.

In subgroup analyses by intervention type, CBT demonstrated a large effect (ES = −1.23, 95% CI: −2.30 to −0.16), whereas ACT showed a moderate effect (ES = −0.53, 95% CI: −0.80 to −0.25). MBI and psychoeducation did not show statistically significant effects on depression. According to delivery format, both offline interventions (ES = −0.93, 95% CI: −1.52 to −0.34) and hybrid interventions (ES = −0.99, 95% CI: −1.76 to −0.21) significantly reduced depression. With respect to intervention duration, short-term interventions demonstrated a moderate effect (ES = −0.52, 95% CI: −0.86 to −0.18), whereas long-term interventions demonstrated a large effect (ES = −1.33, 95% CI: −1.94 to −0.73). Funnel plot analysis also indicated a low likelihood of publication bias.

4. Risk of Bias Assessment

The results of the risk of bias assessment are presented in Figure 3. Random sequence generation was evaluated as having a low risk of bias in all studies (100%). In contrast, allocation concealment was rated as having an unclear risk of bias in 66.7% of studies, reflecting insufficient reporting in several studies. Blinding of participants and personnel was assessed as having a high risk of bias in all studies (100%) due to the inherent characteristics of psychosocial interventions. Blinding of outcome assessment showed a high risk of bias in 73.3% of studies, which was primarily associated with the use of self-reported outcome measures and the resulting potential for reporting bias. In the remaining domains, most studies were evaluated as having a low risk of bias, indicating that the overall completeness and consistency of data reporting were generally adequate.

V. Discussion

This study systematically reviewed and quantitatively synthesized the effects of psychosocial interventions for parents of children with ASD. The findings demonstrated statistically significant and clinically meaningful effects on both parental stress and depression. These results reaffirm the effectiveness of psychosocial interventions in alleviating the substantial psychological burden experienced by parents of

children with ASD and are noteworthy in that the observed effect sizes were relatively larger than those reported in previous studies.

The effect sizes identified in the present study were greater than those reported in previous meta-analyses involving parents of children with ASD. Kulasinghe et al.[11] reported that psychological interventions produced small effects on maternal stress (ES = −0.33) and depression (ES = −0.28). However, a major limitation of that review was that most included studies involved parent-mediated interventions (PMIs), in which parents directly implemented interventions for their children, rather than interventions specifically targeting parental mental health. In contrast, the present study excluded PMIs and included only interventions directly aimed at reducing parental stress and depression. Consequently, large effect sizes were identified for both stress (ES = −1.14) and depression (ES = −0.88). These findings suggest that interventions directly targeting parental mental health may yield greater benefits than indirect approaches focused primarily on child outcomes.

CBT showed a tendency toward the largest observed effect size. However, because this subgroup included only three to four studies and substantial heterogeneity was observed, the evidence is insufficient to draw firm conclusions regarding the comparative superiority of CBT. Nevertheless, the observed pattern is consistent with previous studies suggesting that structured approaches incorporating cognitive restructuring and problem-solving strategies may contribute to improved emotional regulation among parents of children with ASD [37,38].

ACT also demonstrated a statistically significant effect in the present meta-analysis. However, because this subgroup included only two studies for stress and three studies for depression, the findings should be interpreted with caution. Although acceptance-based approaches may enhance psychological flexibility, additional well-designed studies are required before conclusions can be drawn regarding their comparative effectiveness.

MBIs did not demonstrate statistically significant effects in the present analysis. However, because only three studies were available for each outcome, these findings should not be interpreted as evidence of a lack of effectiveness. Rutherford et al.[24] reported that mindfulness- or relaxation-based interventions produced moderate effects on parental stress reduction. Such discrepancies may be attributable to differences in study design, intervention intensity, and participants' baseline stress levels. In particular, the limited number and methodological characteristics of the included MBI studies included in the present analysis may have influenced the findings.

For psychoeducation, a significant effect was observed for depression but not for stress. However, because the stress subgroup consisted of only one study, considerable caution is warranted when interpreting these findings. Nevertheless, psychoeducation may help alleviate depressive symptoms by reducing uncertainty and facilitating cognitive reinterpretation through improved understanding of ASD and the provision of relevant information. These findings are partially consistent with the results reported by Ağırkan et al.[39], which identified moderate intervention effects, and suggest that psychoeducation may be particularly beneficial for certain emotional domains.

Hybrid interventions demonstrated relatively larger observed effect sizes than offline interventions. However, given the limited number of studies and considerable heterogeneity, the available evidence is insufficient to conclude that hybrid delivery is superior to other delivery formats. Hybrid interventions may offer potential advantages by combining face-to-face interaction with digital accessibility; however, this possibility should be confirmed in future studies. This interpretation is consistent with the survey study by Kneubühler et al.[40], which reported that

blended treatment approaches were perceived by mental health professionals as suitable for depression and anxiety disorders. In addition, Butt et al.[41] demonstrated that combining digital interventions with face-to-face therapy contributed not only to symptom reduction but also to improvements in quality of life, while reducing dropout rates through the integration of online learning and in-person sessions. Furthermore, Vanwinkelen et al.[42] reported significant effects of digital interventions combined with offline feedback in the context of health behavior interventions.

Analyses according to intervention duration indicated significant effects across short-, medium-, and long-term interventions; however, no consistent pattern of increasing effectiveness according to duration was identified. This finding suggests that the quality and core components of interventions may be more important determinants of effectiveness than intervention duration itself. Moreover, the substantial variation in intervention duration and number of sessions across studies indicates that standardized intervention protocols have not yet been established, highlighting the need for further research to determine the optimal intensity and duration of psychosocial interventions for parents of children with ASD.

Although parenting stress and general stress are conceptually distinct constructs, both represent important dimensions of parental psychological stress. Accordingly, they were analyzed together to provide a more comprehensive evaluation of psychosocial intervention effects, while subgroup analyses according to stress type were conducted to explore potential differences in intervention effects. Significant effects were observed for both parenting stress and general stress, with relatively larger effect sizes identified for general stress. These findings suggest that the stress experienced by parents of children with ASD extends beyond specific parenting situations and reflects broader psychological burdens affecting overall life functioning. Furthermore, the findings indicate that psychosocial interventions may contribute to alleviating these generalized stress responses in a comprehensive manner. While previous studies [43,44] primarily focused on parenting stress, the present study expands the conceptualization of parental stress by incorporating both parenting stress and general stress into the overall analysis while also examining each construct separately through subgroup analyses. The larger effect size observed for general stress suggests that the psychological difficulties experienced by parents of children with ASD are closely associated with broader life contexts beyond parenting alone, underscoring the need for a more integrated understanding of parental mental health. Taken together, these findings suggest that synthesizing parenting stress and general stress into a broader stress outcome was an appropriate approach for evaluating the overall effects of psychosocial interventions while acknowledging their conceptual distinction. Nevertheless, because parenting stress and general stress represent distinct psychological constructs, the pooled estimates should be interpreted with caution, and future studies should further examine these outcomes separately.

Several limitations of this study should be acknowledged. First, the high heterogeneity across studies may limit the generalizability of the findings. Second, several subgroup analyses included only a small number of studies, limiting the stability of the estimated effect sizes and requiring cautious interpretation of these exploratory findings. Third, because most studies primarily reported short-term outcomes, the long-term sustainability of intervention effects could not be adequately evaluated. Despite these limitations, this study has important implications in that it quantitatively synthesized the effects of psychosocial interventions for parents of children with ASD and simultaneously examined the influence of different intervention characteristics. By integrating subgroup analyses according to intervention type, delivery format, intervention

duration, and stress type, this study provides evidence to support a more comprehensive understanding of parental mental health and may inform the design of future psychosocial interventions for parents of children with ASD.

VI. Conclusion

This study demonstrated that psychosocial interventions for parents of children with ASD significantly reduced stress and depression, with overall large effect sizes. These findings suggest that interventions directly targeting parental mental health constitute an important component of ASD intervention strategies. Although relatively larger effect sizes were observed for CBT and hybrid interventions, these subgroup findings should be interpreted with caution because of the limited number of studies and substantial heterogeneity. Further high-quality randomized controlled trials are needed to determine the comparative effectiveness and long-term outcomes of psychosocial interventions.

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Supplementary Appendix S1

Database: PubMed

Platform: NCBI

Search date: February 12, 2026

Limits: English, No publication year restriction

Search strategy:

#1 Autism: ("Autism Spectrum Disorder"[Mesh] OR "Autistic Disorder"[Mesh] OR "Asperger Syndrome"[Mesh] OR autism[tiab] OR autistic[tiab] OR "autism spectrum disorder*"[tiab] OR "autism spectrum"[tiab] OR asperger*[tiab] OR "pervasive developmental disorder*"[tiab] OR PDD[tiab] OR ASD[tiab])

AND

#2 Parents: ("Parents"[Mesh] OR "Caregivers"[Mesh] OR parent*[tiab] OR mother*[tiab] OR father*[tiab] OR caregiver*[tiab] OR carer*[tiab] OR famil*[tiab])

AND

#3 Intervention: ("Psychotherapy"[Mesh] OR "Cognitive Behavioral Therapy"[Mesh] OR "Mindfulness"[Mesh] OR "Family Therapy"[Mesh] OR psychosocial[tiab] OR psychoeducat*[tiab] OR psychotherapy[tiab] OR counsel*[tiab] OR intervention*[tiab] OR "parent training"[tiab] OR "parent education"[tiab] OR "parent support"[tiab] OR "support group*"[tiab] OR "family-based"[tiab] OR mindfulness[tiab] OR "cognitive behav*"[tiab] OR CBT[tiab] OR "acceptance and commitment therapy"[tiab] OR ACT[tiab] OR "dialectical behav*"[tiab] OR DBT[tiab] OR relaxation[tiab] OR "stress management"[tiab] OR "coping skill*"[tiab])

AND

#4 Outcomes: ("Stress, Psychological"[Mesh] OR "Depression"[Mesh] OR stress*[tiab] OR "parenting stress"[tiab] OR distress[tiab] OR depress*[tiab])

AND

#5 Study design: (randomized[tiab] OR randomised[tiab] OR randomly[tiab] OR trial[tiab] OR RCT[tiab] OR "Randomized Controlled Trial"[Publication Type])

Database: CINAHL

Platform: EBSCOhost

Search date: February 20, 2026

Limits: Peer review; English; No publication year restriction

Search strategy:

(MH "Autism Spectrum Disorder+" OR TI autism OR TI autistic OR TI ASD) AND (MH "Parents+" OR MH "Caregivers+" OR TX parent* OR TX mother* OR TX father* OR TX caregiver*) AND (MH "Cognitive Therapy+" OR MH "Mindfulness+" OR TI "cognitive behavioral therapy" OR TI CBT OR TI mindfulness OR TI "acceptance and commitment therapy" OR TI psychoeducat* OR TI "parent training" OR TI "parent education" OR TI "parent support" OR TI "parent coaching" OR TI "parent-mediated") AND (MH "Stress, Psychological+" OR MH "Depression+" OR TX stress* OR TX "parenting stress" OR TX depress*) AND (TX “Randomized Controlled Trial” OR TX randomized OR TX randomised OR TX RCT)

Database: Embase

Platform: Elsevier

Search date: February 20, 2026

Limits: English, No publication year restriction

Search strategy:

('autism spectrum disorder'/exp OR autism:ti,ab OR autistic:ti,ab OR ASD:ti,ab) AND ('parent'/exp OR 'caregiver'/exp OR parent*:ti,ab OR mother*:ti,ab OR father*:ti,ab OR caregiver*:ti,ab OR famil*:ti,ab) AND ('psychotherapy'/exp OR 'cognitive therapy'/exp OR 'mindfulness'/exp OR 'family therapy'/exp OR psychosocial:ti,ab OR psychoeducat*:ti,ab OR intervention*:ti,ab OR "parent training":ti,ab OR "acceptance and commitment therapy":ti,ab OR ACT:ti,ab OR CBT:ti,ab OR mindfulness:ti,ab OR relaxation:ti,ab OR "stress management":ti,ab) AND ('psychological stress'/exp OR depression/exp OR stress*:ti,ab OR "parenting stress":ti,ab OR depress*:ti,ab) AND ('randomized controlled trial'/exp OR random*:ti,ab OR trial:ti,ab OR RCT:ti,ab)

Database: Cochrane Library

Platform: Wiley

Search date: February 25, 2026

Limits: English; No publication year restriction

Search strategy:

("autism spectrum disorder" OR autism OR autistic OR ASD) AND (parent* OR caregiver* OR mother* OR father*) AND ("parent training" OR psychoeducation OR mindfulness OR "cognitive behavioral therapy" OR CBT OR "acceptance and commitment therapy" OR "parent support") AND ("parenting stress" OR stress OR depression) AND (randomized OR randomised OR RCT OR trial)

Database: RISS

Platform: RISS

Search date: March 5, 2026

Limits: Korean; No publication year restriction

Search strategy:

(자폐 OR 자폐스펙트럼 OR 자폐스펙트럼장애) AND (부모 OR 어머니 OR 아버지 OR 보호자) AND (심리사회적 OR 부모교육 OR 부모훈련 OR 부모지지 OR 심리치료 OR 인지행동치료 OR 마음챙김 OR 수용전념치료 OR 회복 OR 교육 OR 마음 OR 관리 OR 훈련) AND (스트레스 OR 양육스트레스 OR 우울)

Database: KISS

Platform: KISS

Search date: March 5, 2026

Limits: Korean; No publication year restriction

Search strategy:

(자폐 OR 자폐스펙트럼 OR 자폐스펙트럼장애) AND (부모 OR 어머니 OR 아버지 OR 보호자) AND (심리사회적 OR 부모교육 OR 부모훈련 OR 부모지지 OR 심리치료 OR 인지행동치료 OR 마음챙김 OR 수용전념치료 OR 회복 OR 교육 OR 마음 OR 관리 OR 훈련) AND (스트레스 OR 양육스트레스 OR 우울)

Database: ScienceON

Platform: ScienceON

Search date: March 5, 2026

Limits: Korean; No publication year restriction

Search strategy:

(자폐 OR 자폐스펙트럼 OR 자폐스펙트럼장애) AND (부모 OR 어머니 OR 아버지 OR 보호자)AND (심리사회적 OR 부모교육 OR 부모훈련 OR 부모지지 OR 심리치료 OR 인지행동치료 OR 마음챙김 OR 수용전념치료 OR 회복 OR 교육 OR 마음 OR 관리 OR 훈련) AND (스트레스 OR 양육스트레스 OR 우울) AND (무작위 OR 무작위배정 OR 무작위대조시험 OR 무작위 임상시험 OR 임상시험 OR 실험연구 OR 중재연구)

Abbreviations

ACT, Acceptance and Commitment Therapy; ASD, Autism Spectrum Disorder; CBT, Cognitive Behavioral Therapy; Emtree, Elsevier Life Science Thesaurus; MeSH, Medical Subject Headings; MH, CINAHL Subject Heading; RCT, randomized controlled trial; tiab, title/abstract; ti,ab, title/abstract; TX, text word.

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