

The effectiveness of technology-based intervention programs in the prevention of child abuse: A systematic review and meta-analysis study[☆]

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ABSTRACT

This study was conducted with the aim of revealing the effectiveness of technology-based intervention programs in the prevention of child abuse. For this systematic review and meta-analysis study, researches were obtained by searching PubMed, Web of Science, Scopus, Google Scholar and National Thesis Center of the Council of Higher Education databases without any year limitation. After the review, 18 studies were included in the study. The data were synthesized by meta-analysis and narrative methods. In this systematic review and meta-analysis, it was found that technology-based intervention programs were effective in preventing child abuse in educators and caregivers (SMD: 0.673; 95% CI: 0.500–1.243; Z = 4.594, p = 0.00, (I² = 77.6%). In addition, technology-based intervention programs were found to be effective in preventing child abuse in children SMD: 0.255 95% CI: −0.059 to 0.570; Z = 1.589, p = 0.112, (I² = 59.6%) and parents (SMD: 0.194 95% CI: −0.584 to 0.973; Z = 0.490, p = 0.624, (I² = 97.6%). This study showed that technology-based intervention programs can play a beneficial and important role on individuals in the prevention of child abuse.

1. Introduction

Child abuse refers to actions that affect children's physical and psychological health and harm child development. This type of abuse can be perpetrated by parents, caregivers, or another person in a custodial role (e.g. clergy, coaches, teachers), and people who have developed power and trust in their relationship with the child (Gülmak and Orak, 2021). According to reports by the World Health Organization, a substantial proportion of young children experience violence within their home environment; approximately 60% of children under five are exposed to physical or emotional aggression by parents or caregivers. In addition, global estimates indicate that about one in five women and one in seven men experienced sexual abuse during childhood (World Health

Organization (WHO), 2018). According to the results of a study (2010) on child abuse and domestic violence conducted in collaboration with the “United Nations International Children's Emergency Fund (UNICEF)”, the prevalence of emotional abuse was reported to be 49% (UNICEF, 2010). According to the results of the Research on Child Abuse and Domestic Violence in Turkey (UNICEF Turkey, 2018), while exposure to undesirable behaviors in the field of emotional abuse occurs for one out of every two children in the 7–18 age group in environments such as school, family, etc., it was determined that 45% of children were subjected to physical abuse and 1% to sexual abuse. Studies reveal the significant physical, psychological, social and behavioral negative effects of child abuse. Children who are exposed to maltreatment may experience a wide range of adverse outcomes across physical, cognitive,

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emotional, and social domains. These consequences can manifest as physical trauma, developmental delays, disruptions in neurobiological functioning, and difficulties in forming healthy attachments. Affected children are also at heightened risk for problems such as impaired social-emotional and behavioral functioning, reduced perceptual reasoning, depression, anxiety, and post-traumatic stress symptoms. Longer-term effects may include substance use, aggression, suicidal behavior, obesity, engagement in risky behaviors, early pregnancy, involvement in criminal activities, repeated victimization, diminished academic achievement, and lower employment or economic stability. In the most severe cases, maltreatment may even result in preventable mortality (Özbay et al., 2024; Wado et al., 2025; Segal et al., 2021; Aird et al., 2020).

Since child abuse is preventable and causes devastating effects on children, families and societies, there is a need to develop standardized prevention programs (Baggett et al., 2017). It is thought that technology-based innovations can play a useful role in preventing child abuse. In recent years, with technological developments, the use of technology-based approaches in remote intervention programs designed to protect and prevent child abuse has been increasing (Altunpul and Koçtürk, 2024; Baggett et al., 2017). Indeed, in the systematic review conducted by Altunpul and Koçtürk (2024), it was stated that technology-supported programs for the prevention of child abuse and neglect are increasingly included in the existing literature and that these programs are largely structured as web/internet-based applications. Malamsha et al. (2021) developed a mobile-based game to prevent child sexual abuse in Tanzania. Findings indicated that the children involved in the study showed strong interest in the mobile-based game and reported enjoyment while engaging with the activities it offered. The study further demonstrated that mobile-delivered educational tools can serve as an effective technology-supported approach for enhancing both children's and parents' knowledge and skills related to preventing child sexual abuse (Malamsha et al., 2021). Research involving children diagnosed with autism spectrum disorder (ASD) showed that technology-assisted instructional programs can successfully promote knowledge and skill development related to sexual abuse prevention (Ünlü, 2023). Similarly, the findings of Güllermak and Orak (2021) indicated that a six-week, web-based distance education program has the potential to enhance parents' awareness and recognition of emotional abuse. In a meta-analysis study conducted by Zhang et al. (2024), it was reported that online parenting programs had positive effects on outcomes related to child abuse and provided significant improvements in inappropriate parenting attitudes and cognitive processes. These studies show that technology-based interventions offer innovative solutions in terms of both content and implementation in the prevention of child abuse. Therefore, the literature on the effectiveness of technology-based intervention programs in the prevention of child abuse shows that these programs are effective on educators, caregiving professionals, parents, and children, but need to be supported by more comprehensive and long-term research. Therefore, in the light of the existing findings in the field, systematic evaluation and development of the effectiveness of technology-based intervention programs is of critical importance in the prevention of child abuse. In this context, in order to fill the gap in the literature, it was aimed to evaluate the effectiveness of technology-based intervention programs in the prevention of child abuse by meta-analysis method.

2. Method

2.1. Design and search strategy

This systematic review and meta-analysis was conducted in alignment with the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses; Page et al., 2021). To minimize potential bias, two researchers independently carried out the literature search, screened the studies, and extracted the relevant data.

Subsequently, these procedures were verified by two additional researchers to ensure accuracy and consistency. The methodological quality of the studies included in the review and meta-analysis was assessed by the research team using standardized evaluation criteria.

2.1.1. Inclusion criteria

In this study, studies were screened according to PICOS;

- ✓ P: Population: Children, parents, educators and health care professionals
- ✓ I: Intervention: Implementation of technology-based interventions (with emphasis on educational programs) for the prevention of child abuse
- ✓ C: Comparison: Non-implementation of technology-based interventions (with emphasis on educational programs) for the prevention of child abuse
- ✓ O: Outcomes: Awareness on prevention of child abuse
- ✓ S: Study design: Experimental or quasi-experimental research reported in Turkish or English.

2.1.2. Exclusion criteria

Letter to the editor, case-control, systematic and traditional review studies were excluded from the scope of this study.

2.1.3. Screening strategy

Dredging until October 2025, MeSH-appropriate ("child abuse" OR "child maltreatment" OR "child neglect" OR "child sexual abuse" OR "child protection") AND (digital OR "web-based" OR web OR online OR "mobile app" OR mHealth OR eHealth OR telehealth OR telemedicine OR "virtual" OR game* OR "interactive" OR video OR "SMS" OR "text message" OR app OR software) AND (prevent* OR interven* OR "parent training" OR "body safety" OR "selfprotection" OR "safety education" OR "awareness") AND (randomized OR randomised OR "randomized controlled trial" OR "controlled trial") keywords in "PubMed, Scopus, Web of Science, National Thesis Center of the Council of Higher Education and Google Scholar" were searched. Because research examining the impact of technology-based interventions on preventing child abuse is limited, no publication year restrictions were applied, and studies from all available years were included in the search.

2.2. Selection of studies

The database search initially yielded 1183 records. Following the removal of duplicates, 1170 records remained for title and abstract screening. This stage resulted in 431 studies being identified for full-text review. Of these, the full texts of 120 articles were accessible and evaluated according to the predetermined inclusion and exclusion criteria. Ultimately, 18 studies that reported outcomes related to technology-based interventions aimed at preventing child abuse were deemed eligible and included in the analysis. A detailed summary of the study selection process is presented in Fig. 1.

2.3. Collection of study data

A data extraction form created by the research team was used to gather the necessary information from the included studies. Through this tool, key study characteristics—such as author and publication year, methodological design, and type of intervention—were systematically recorded for all studies incorporated into the systematic review and meta-analysis (Table 1).

2.4. Research ethics

This study is a systematic review and meta-analysis and is based on studies published in the literature.

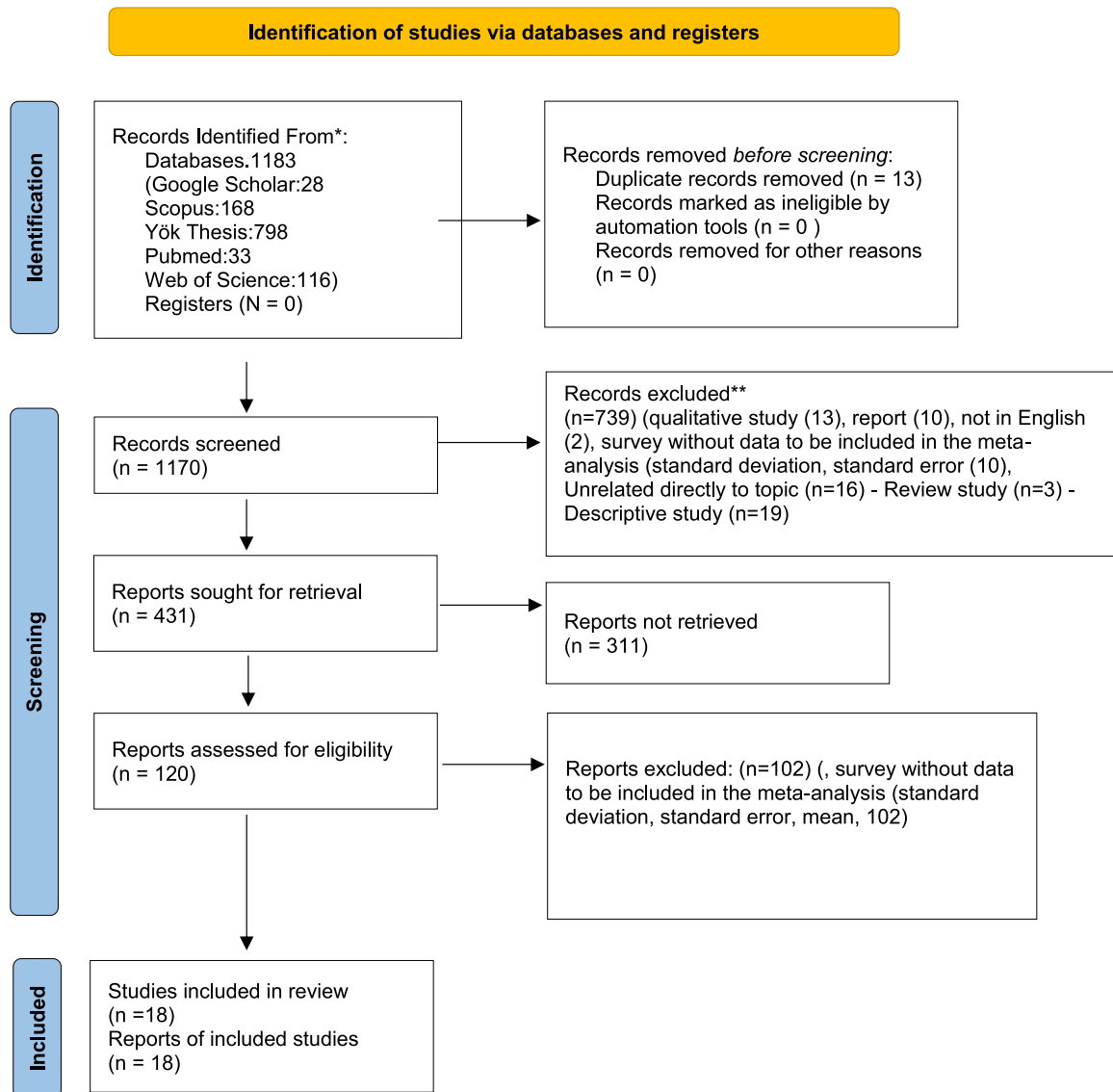


Fig. 1. PRISMA 2020 flow diagram for study selection.

2.5. Evaluation of the methodological quality of the studies

The methodological quality of the studies included in this systematic review and meta-analysis was evaluated using the Joanna Briggs Institute (JBI) critical appraisal tools, each selected according to the specific research designs represented in the dataset. For randomized controlled trials, a 13-item JBI checklist was applied (Aromataris et al., 2024). Each item on these tools is rated using the response options “Yes,” “No,” “Unclear,” or “Not Applicable.” Four authors independently completed the quality assessments, and any discrepancies were resolved through discussion to reach consensus. The quality appraisal outcomes for each study are presented in Table 1 under the heading “Quality Score” and were incorporated into the overall data synthesis.

2.6. Synthesis of data

Statistical analyses were conducted using Comprehensive Meta-Analysis (CMA) Version 2 software. Variability across studies was assessed through the Chi-square test and Higgins’ I^2 index, where I^2 values exceeding 50% were considered indicative of notable heterogeneity (Higgins et al., 2003). For all analyses, a p-value below 0.05 was accepted as the threshold for statistical significance (Borenstein et al.,

2021).

3. Results

The process used to identify and select studies for this systematic review and meta-analysis is illustrated in the PRISMA flow diagram presented in Fig. 1.

3.1. Results of meta-analysis on the effectiveness of technology-based intervention programs in the prevention of child abuse in children

In this study, publication bias was examined using two complementary approaches: (a) a funnel plot and (b) the Begg and Mazumdar rank correlation test. Visual inspection of the funnel plot demonstrated an approximately symmetrical distribution of effect sizes around the pooled estimate, suggesting no substantial small-study effects (Fig. 2). Although minor dispersion was observed, this pattern is expected given the limited number of included studies. To complement the visual assessment, the Begg and Mazumdar rank correlation test was conducted. The test yielded a non-significant two-tailed p-value ($p = 0.46$), indicating no statistically significant evidence of publication bias. Taken together, the visual symmetry of the funnel plot and the non-significant

Table 1

Characteristics and main findings of the studies included in the systematic review and meta-analysis.

Author/Year	Working Pattern	Sample group	Sample volume characteristic	Scale used	Type of intervention	Main results	Quality score
Durmaz et al., 2025	Quasi-experimental	Children at primary school level	Experimental group:21 Control group:20	Abuse Prevention Skills Form"	Online awareness program	Prepared by The training content was first provided online to the parents in the training group and was then read by their parents. The effect of the personal safety training provided to the children was analyzed through the answers given by the children. When the findings obtained were compared with the control group, it was observed that children who were trained by their parents knowledge and skills on protection from sexual abuse have increased.	Yes: 9/ 9
Chen et al., 2025	Randomized controlled	Adolescent children	Experimental group:55 Control group:50	The European Cyberbullying Intervention Project Questionnaire (ECIPQ)	Digital game-based GISCC program	Results showed that the GISCC intervention significantly reduced cyberbullying behaviors, violent intentions and mental health problems; increased self-efficacy and conflict resolution skills.	Date: 13/13
Eguren et al., 2023	Randomized controlled	Parents	Experimental group:24 Control group:17	The Emotional Availability Scales	Attachment Video-Feedback Intervention	Compared to the control group, emotional availability increased in parents and children exposed to AVL.	Date: 13/13
Ondersma et al., 2017	Randomized controlled	Parents	Experimental group:131 Control group:141	CTS-PC Conflict Tactics Scale	Home visit	There was no difference in abuse or significant risk factors between the groups at either time point	Yes: 9/13 No:2/13 Undetermined:1/13 Not applicable:1/13
Van der Asdonk et al., 2020	Randomized controlled	Parents	Experimental group:28 Control group:28	Child Behavior Checklist (CBCL)	Video-based parent-child attachment program	Children had fewer behavioral problems as a result of the study.	Date: 13/13
Gulirmak and Orak, 2021	Randomized controlled	Parents	Experimental group:30 Control group:30	PARI, Parental Attitude Research Instrument	Web-based training program	Web-based distance education was found to increase parents' awareness of child rearing and emotional abuse.	Date: 13/13
Urbann et al., 2020	Quasi-experimental	Children of primary school age	90 children	WIST	Evidence-based sexual abuse program	Children showed a significant increase in knowledge and an insignificant change in their anxiety.	Yes: 9/9
Gushwa et al., 2019	Quasi-experimental	Teachers	Experimental group:55 Control group:61	Question form	Web-based training program	Teachers' level of knowledge increased.	Yes: 9/9
Baggett et al., 2017	Randomized controlled trial	Parents	Experimental group:89 Control group:76	Attention-Control Condition: Developmental Awareness Skills (DAS).	Remote parenting program	An effect by intervention dose was found for increased positive parental behavior and reduced potential for child abuse.	Date: 13/13
Rheingold et al., 2015	Randomized controlled trial	Parents	Experimental group:88 Control group:93	CSA Knowledge Questionnaire	Child abuse prevention training	Representatives have shown to influence knowledge, attitudes and preventive behaviors.	Date: 13/13
Ozçelik Subaşı and Ocakçı, 2024	Randomized controlled trial	Parents	Experimental group:15 Control group:15	Parental Child Neglect and Abuse Awareness Scale	Child abuse and neglect prevention training	The level of knowledge of pregnant women increased.	Date: 13/13
Yılmaz, 2019	Quasi-experimental	Teachers	28 teachers	Teachers' Attitudes towards Reporting Sexual Abuse Scale (ÖCİBTÖ)	Child abuse and neglect prevention training	Teachers' level of knowledge has increased.	Yes: 9/9
Karakoç, 2025	Quasi-experimental	Adolescents	16 children	Interaction with Strangers on the Internet Scale (IIS):	Planned Behavior Training to Increase Awareness of Interacting with Strangers Online	A decrease in adolescents' level of interaction with strangers was found.	Yes: 9/9
Nickerson et al., 2018	Randomized controlled	Parents	Experimental group:226 Control group:239	knowledge of child sexual abuse (CSA)	Child protection videos	Increased knowledge of parents	Date: 13/13

(continued on next page)

Table 1 (continued)

Author/Year	Working Pattern	Sample group	Sample volume characteristic	Scale used	Type of intervention	Main results	Quality score
König et al., 2020	Randomized controlled	Health professionals	Experimental group:107 Control group:136	The assessment of perceived knowledge on the topic	E-learning trainings	Increased knowledge of health professionals	Date: 13/13
Rheingold et al., 2012	Randomized controlled	Child care professionals	Experimental group:95 Control group:93	Feasibility And Acceptability Questionnaire	Child sexual abuse prevention program	Increased knowledge of health professionals	Yes: 9/13 No:2/13 Undetermined:1/13 Not applicable:1/13 Date: 13/13
Delaney et al., 2012	Randomized controlled	Parents	Experimental group:51 Control group:41	KCAN = Knowledge Scale, Child Abuse and Neglect	Web-enabled training program	Increased knowledge of parents	Date: 13/13
Han et al., 2025	Randomized controlled	Nursing students	Experimental group:30 Control group:27	4-point Likert scale	Child abuse simulation training using forensic nursing approach	The level of knowledge of nursing students has increased.	Date: 13/13
Bennett and O'Donohue, 2020	Randomized controlled	Children	Experimental group:48 Control group:49	Presentation feedback form	Child sexual abuse prevention program	The knowledge level of the children's students has increased.	Date: 13/13

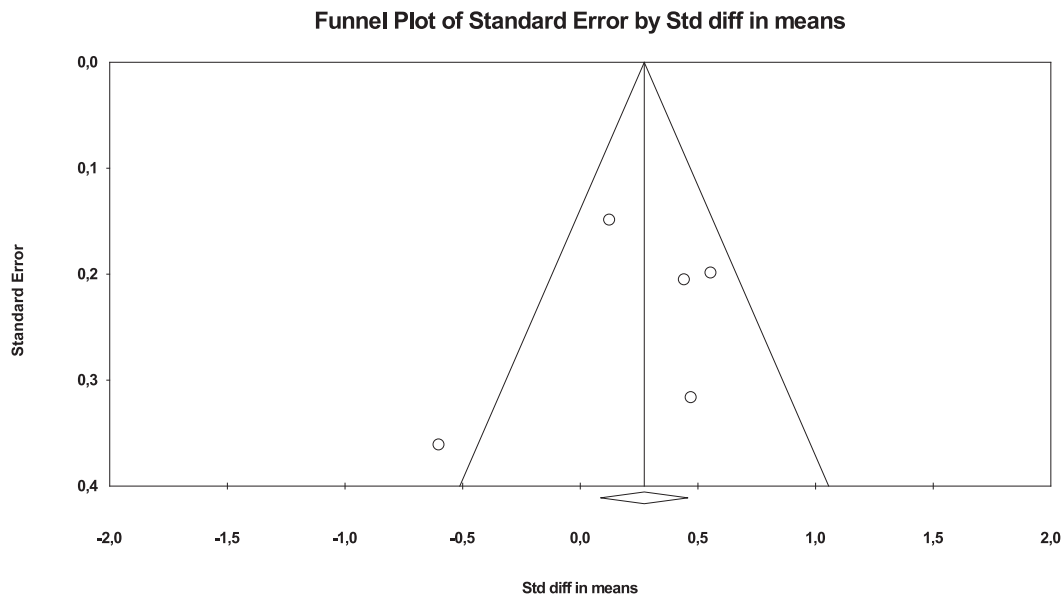


Fig. 2. Funnel plot of studies reporting results on the effectiveness of technology-based intervention programs in the prevention of child abuse in children.

rank correlation test suggest that publication bias is unlikely to have materially influenced the pooled effect size estimates.

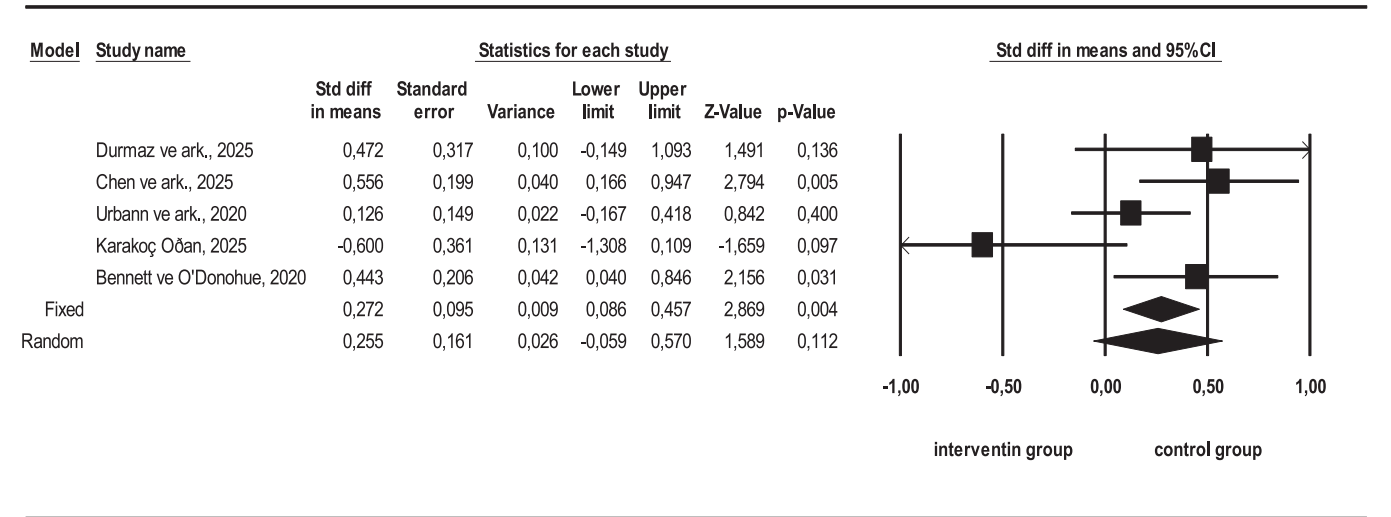
Fig. 3 presents the individual and pooled effect sizes of five studies evaluating the effectiveness of technology-based intervention programs for the prevention of child abuse. Individual study effects varied considerably in both magnitude and direction, ranging from a moderate negative effect ($SMD = -0.600$) to moderate positive effects exceeding 0.50, indicating substantial between-study variability. Using a random-effects model, the pooled standardized mean difference indicated a small and statistically non-significant overall effect favoring the intervention group ($SMD = 0.194$, 95% CI: -0.584 to 0.973 ; $Z = 0.490$, $p = 0.624$). In contrast, the fixed-effect model yielded a statistically significant pooled estimate ($SMD = 0.27$, $p = 0.004$), suggesting that model choice substantially influenced the observed results.

Heterogeneity among studies was extremely high ($I^2 = 97.6\%$), indicating that the observed variability in effect sizes was largely attributable to real differences between studies rather than sampling error. This substantial heterogeneity suggests that intervention effects varied markedly across studies, and therefore the pooled estimates should be interpreted with caution.

3.2. Meta-analysis results on the effectiveness of technology-based intervention programs in the prevention of child abuse in parents

In this analysis, publication bias was assessed using two approaches: (a) a funnel plot and (b) the Begg and Mazumdar rank correlation test. The funnel plot displayed a generally symmetrical distribution of studies in the upper region of the graph, suggesting that publication bias was unlikely to be present (Fig. 4). Consistent with this observation, the Begg and Mazumdar test produced a two-tailed p-value of 0.60, indicating that the bias was not statistically significant.

Fig. 5 presents the individual and pooled effect sizes of studies evaluating the effectiveness of technology-based intervention programs for parents in the prevention of child abuse. Individual study effects varied markedly in both magnitude and direction, ranging from large negative effects to large positive effects, reflecting considerable between-study variability. Under the random-effects model, the pooled standardized mean difference indicated a small and statistically non-significant effect favoring the intervention group ($SMD = 0.194$, 95% CI: -0.584 to 0.973 ; $Z = 0.490$, $p = 0.624$). In contrast, the fixed-effect model produced a statistically significant pooled estimate ($SMD =$



Meta Analysis

Fig. 3. Forest plot for the effectiveness of technology-based intervention programs in preventing child abuse in intervention and control groups.

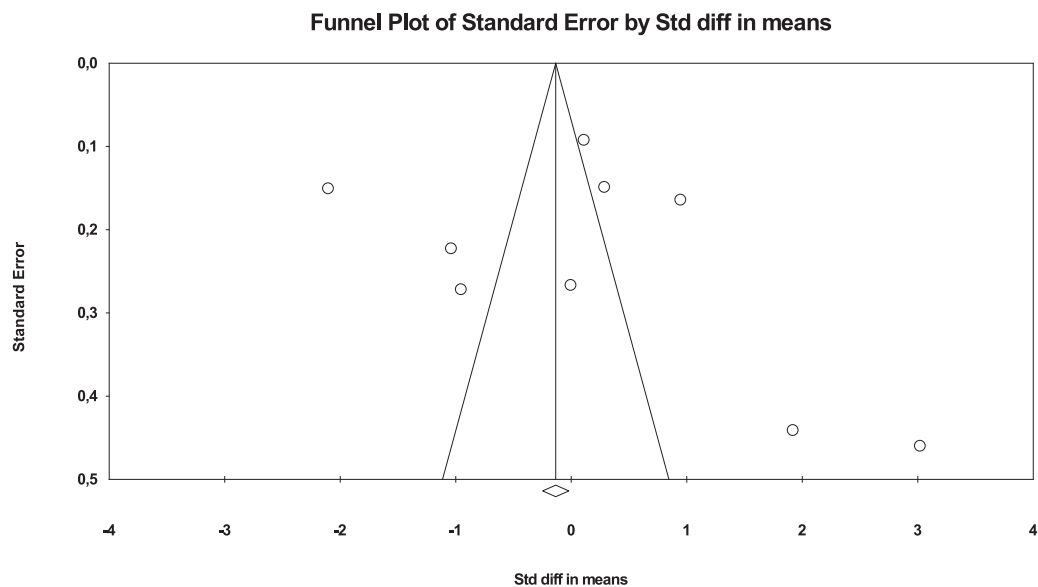


Fig. 4. Funnel plot of studies reporting results on the effectiveness of technology-based intervention programs in the prevention of child abuse in parents.

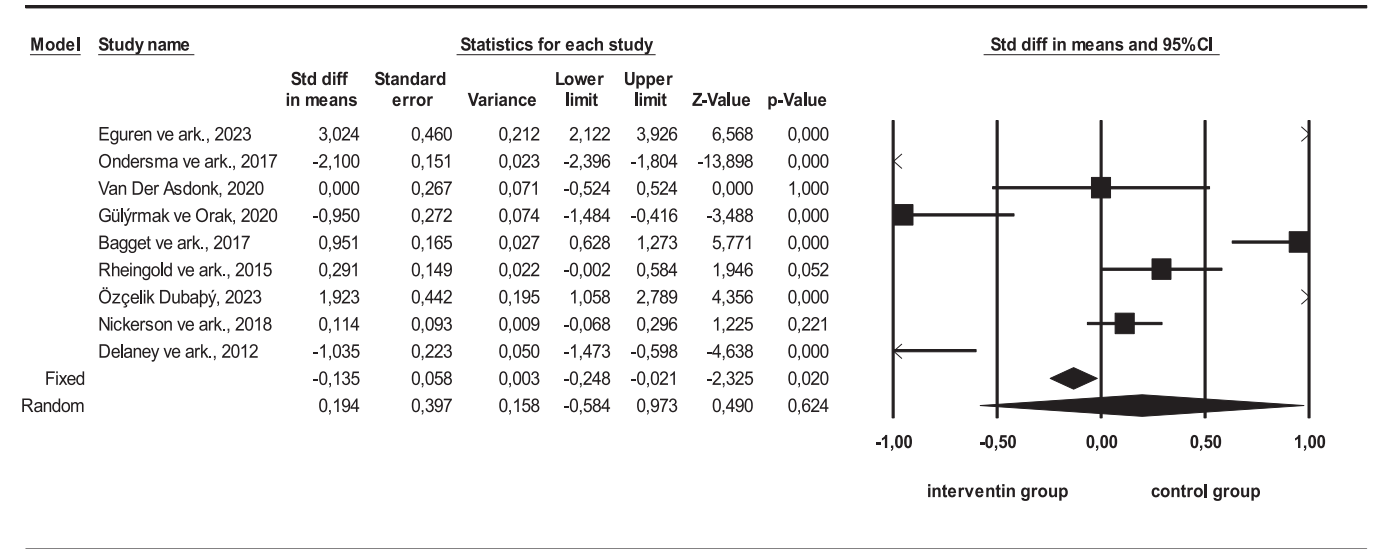
–0.135, $p = 0.020$), highlighting the sensitivity of pooled results to model specification. Heterogeneity among studies was extremely high ($I^2 = 97.6\%$), indicating that the observed variability in effect sizes was largely attributable to real differences between studies rather than sampling error. This substantial heterogeneity suggests that intervention effects differed considerably across studies, and therefore the pooled estimates should be interpreted with caution (Fig. 5).

3.3. Meta-analysis results on the effectiveness of technology-based intervention programs in the prevention of child abuse in educators and health care professionals

In this study, the presence of publication bias was determined using two methods: (a) funnel scatter plot and (b) Begg & Mazumdar Correlation Test. In the funnel plot, which is one of the most important methods to show publication bias, we see that the studies in this dataset show a symmetrical distribution at the top of the funnel. This shows that there is no publication bias (Fig. 6). This visual assessment was

supported by the Begg and Mazumdar rank correlation test, which yielded a non-significant two-tailed p -value ($p = 0.73$), indicating no statistically significant evidence of publication bias.

Fig. 7 presents the individual and pooled effect sizes of studies evaluating the effectiveness of technology-based intervention programs among educators and health care professionals in the prevention of child abuse. Individual study results consistently favored the intervention group, with effect sizes ranging from moderate to large. Using a random-effects model, the pooled standardized mean difference indicated a statistically significant and substantial overall effect in favor of the intervention group (SMD = 0.673, 95% CI: 0.500–1.243; $Z = 4.594$, $p < 0.001$). Moderate to high heterogeneity was observed among studies ($I^2 = 77.6\%$), suggesting that while the overall effect was robust, the magnitude of intervention effectiveness varied across studies. This variability likely reflects differences in intervention content, delivery format, professional roles of participants, and study contexts. Despite variability in effect size magnitude, all studies demonstrated effects favoring the intervention group, supporting the effectiveness of



Meta Analysis

Fig. 5. Forest plot for the effectiveness of technology-based intervention programs in preventing abuse among parents in intervention and control groups.

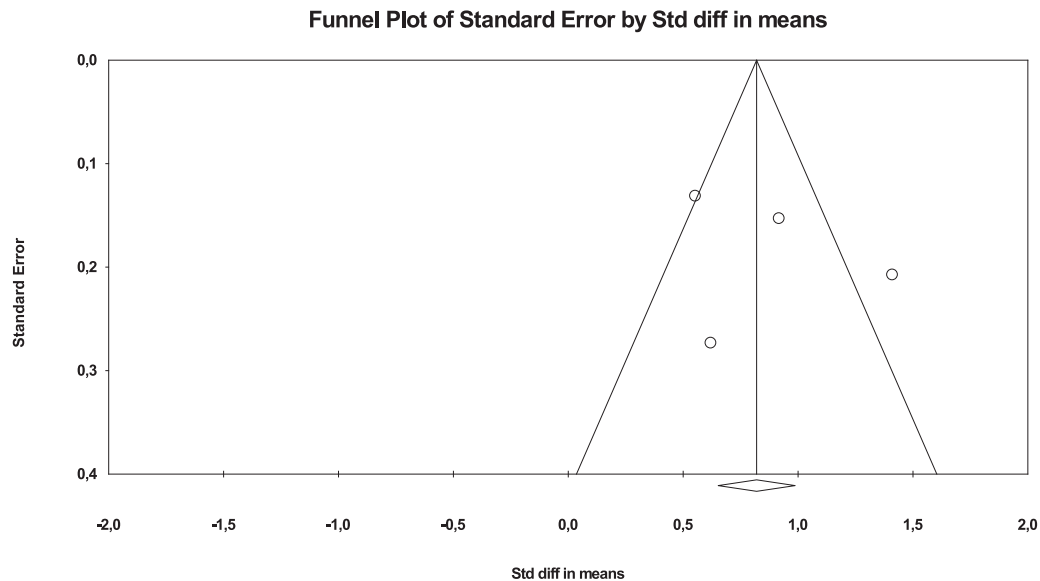


Fig. 6. Funnel plot of studies reporting results on the effectiveness of technology-based intervention programs in the prevention of child abuse in educators and health care professionals.

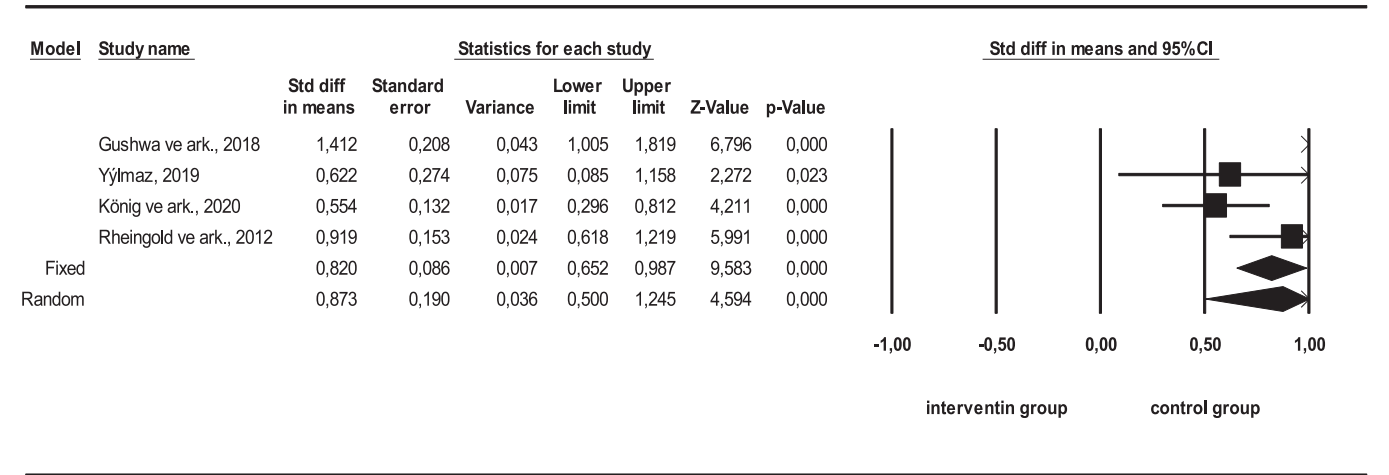
technology-based interventions for educators and health care professionals.

4. Discussion

Child abuse continues to exist as a multidimensional public problem that threatens the health, safety and development of children. Intervention programs developed to prevent child abuse have evolved into digital and technology-based practices in recent years (Altunpul and Koçtürk, 2024; Asadzadeh et al., 2022; Reddy and Sinha, 2025). It is seen that these programs offer important opportunities for educators, caregivers, children and parents in the prevention of child abuse. However, there are different findings in the literature about the effectiveness and impact of these programs (Altunpul and Koçtürk, 2024; Asadzadeh et al., 2022; Reddy and Sinha, 2025; Rodríguez-Rivas et al., 2025; Patterson et al., 2022; Walsh et al., 2018). Therefore, it is thought

that this meta-analysis study, which evaluates the effectiveness of technology-based intervention programs in different target groups in the prevention of child abuse, will make important contributions to the field.

This meta-analysis shows that technology-based intervention programs in the prevention of child abuse have a significant and positive effect on educators and caregivers. In a Systematic Review conducted by Altunpul and Koçtürk (2024), it was reported that technology-supported prevention programs for the prevention of child abuse were effective in child care professionals and showed cognitive and behavioral improvements. In a scoping review conducted by Asadzadeh et al. (2022), it was found that virtual reality and digital games-based interventions were effective in recognizing the signs of abuse, strengthening decision-making processes and increasing awareness of abuse cases. In a systematic review conducted by Reddy and Sinha (2025), it was found that virtual reality-based technology applications increased the ability



Meta Analysis

Fig. 7. Forest plot for the effectiveness of technology-based intervention programs in preventing abuse in educators and health care professionals in intervention and control groups.

of child care professionals to recognize child abuse and contributed to gaining self-confidence and awareness. It is seen that the finding that technology-based interventions are effective in educators and caregivers in preventing abuse is consistent with the literature (Altunpul and Koçtürk, 2024; Asadzadeh et al., 2022; Reddy and Sinha, 2025). Considering that educators and caregivers need information about the frequency of contact with the child, the level of awareness of the signs of abuse and the procedures related to the process, it is an expected result that technology-based interventions will create a strong learning outcome in the prevention of child abuse. The fact that technology-based interventions are easily accessible, that the materials are supported by audiovisual stimuli and that they allow repetition suggests that permanent gains at the behavioral and cognitive level may be supported in these groups.

In this meta-analysis, it was determined that technology-based intervention programs in the prevention of child abuse did not have a significant effect on children and parents. A meta-analysis by Rodríguez-Rivas et al. (2025) showed that technology-based interventions had a small but significant effect on well-being in children and adolescents. However, this effect size is thought to be insufficient to create behavioral change in a multifactorial area of prevention of child abuse. In addition, the majority of the studies examined focused only on the individual well-being of children independent of parents, indicating that these interventions do not include sufficient components in the prevention of abuse (Rodríguez-Rivas et al., 2025). In a systematic review conducted by Patterson et al. (2022), it was determined that online interventions to prevent child abuse increased knowledge in children but did not change behavior. In interventions for parents, it was reported that although awareness increased, protective parenting behaviors did not change (Patterson et al., 2022). In a scoping review conducted by Asadzadeh et al. (2022), it was reported that game-based programs for children increased the level of knowledge about child abuse, but did not have a lasting effect on avoiding risky situations, seeking help or reporting abuse. Similarly, technology-based interventions for parents have been reported to have limited effects on transforming parenting practices despite increasing participation (Aldridge et al., 2024; Asadzadeh et al., 2022). Walsh et al. (2018) found that school-based education programs in the prevention of child abuse increased children's knowledge levels but did not lead to behavioral change. In addition, in this study, it was stated that parental participation in intervention programs was very low and abuse prevention components targeting parents were ineffective or very limited (Walsh et al., 2018). It is thought that this may be due to the multidimensional nature of child abuse and

the fact that family-based risk factors are very difficult to change only with technological interventions. Inadequate adaptation of technology-based programs to children's developmental level may limit intervention effectiveness. Recent evidence indicates that digital environments can function not only as platforms for prevention but also as risk-enhancing contexts (Altunpul and Koçtürk, 2024; Ramaswamy et al., 2025). Ramaswamy et al. (2025) report that algorithm-driven platforms and radical digital subcultures may reinforce harmful beliefs, normalize violence, and remain largely inaccessible to parental monitoring. This dual role of digital technologies may help explain the limited effectiveness of technology-based interventions among children and parents. When preventive content is delivered within the same digital spaces that expose children to unregulated or developmentally inappropriate material, its impact may be diluted or counteracted. These findings highlight the need for developmentally appropriate designs, stronger safeguards, and integration with family-based and offline support mechanisms. It is thought that factors such as parents' difficulty in continuing digital interventions, variability of family dynamics, low motivation and socioeconomic conditions may also limit the effectiveness of the programs. Therefore, the fact that technology-based interventions are effective for educators and caregiving professionals but limited for children and parents is consistent with the existing literature and reveals the necessity of multicomponent, comprehensive, child-parent-professional integrated models with face-to-face support. It is suggested that technology-based interventions targeting educators and professionals are highly functional in the prevention of child abuse, whereas parent- and child-focused practices may require strengthening through more holistic, family-based, interactive, and multicomponent approaches that incorporate the broader social environment. From a practical perspective, the lack of a statistically significant pooled effect under the random-effects model should not be interpreted as evidence of the overall ineffectiveness of technology-based interventions. Rather, this finding suggests that intervention effectiveness may vary considerably depending on contextual and programmatic factors, such as the target population, intervention structure, and delivery modality. These results underscore the importance of developing more tailored and standardized intervention designs in future research.

4.1. Limitations

Some of the studies included in the systematic review and meta-analysis were characterized by small sample sizes and a lack of blinding procedures. Such methodological limitations may weaken the

overall evidentiary strength of the study findings.

5. Conclusion

The findings of this study indicate that technology-based intervention programs are beneficial for educators and caregivers in preventing child abuse. Conversely, these interventions did not demonstrate a significant impact on children or parents. Future research should include randomized controlled trials with larger sample sizes to more robustly assess the effectiveness of technology-driven approaches in the prevention of child abuse.

CRedit authorship contribution statement

Sevda Uzun: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation. **Bahar Aksoy:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Gökçe Demir:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Edanur Tar Bolacali:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Financial Disclosure

None.

Statements and Declarations

During the preparation of this manuscript, the authors used Grammarly and DeepL for language editing purposes only. After using these tools, the authors carefully reviewed and revised the content as needed and take full responsibility for the final version of the manuscript.

Declaration of Competing Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

The author(s) affirm that the methods used in the data analyses are suitably applied to their data within their study design and context, and the statistical findings have been implemented and interpreted correctly.

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