IJBS
10.30491/ijbs.2026.562982.2291
International Journal of Behavioral Sciences
Original Paper

Play as Antidote: Virtual Parenting to Curb Child Anxiety in Pandemic-era Iran

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Submitted: 30November 2025
Accepted: 14 January 2026

Int J Behav Sci. 2026; 19(4): 246-257

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Abstract

Introduction: Quarantine, while a critical public health measure for controlling infectious diseases, imposes considerable psychosocial burdens, particularly on young children and their parents. This study investigated the efficacy of a virtual cognitive-behavioral play therapy (CBPT) program in (a) enhancing the quality of parent-child interaction (specifically, increasing closeness and reducing conflict), (b) improving children's awareness and attitudes toward COVID-19, and (c) reducing anxiety symptoms in children aged 4 to 6 years during quarantine.

Method: Using a convenience sampling method, mothers of children aged 4–6 years were recruited via social media announcements and screened for eligibility. A total of 57 eligible participants were assigned to either an intervention group (n = 26) or a waitlist control group (n = 31). The intervention group participated in eight weekly 90-minute virtual CBPT sessions delivered via the Skyroom platform. Outcomes were assessed using the Coronavirus Awareness and Attitude Questionnaire (Elahi, 2020), the Spence Children's Anxiety Scale – Parent Version (Spence, 1997), and the Pianta Parent–Child Relationship Scale (1994). Data were collected at pretest and posttest and analyzed using multivariate analysis of covariance (MANCOVA).

Results: Two groups were comparable at baseline ($p>.05$). MANCOVA showed significant intervention effects on child anxiety (Pillai's Trace = 0.34, $p=.001$) and parent–child interaction (Pillai's Trace = 0.28, $p=.002$). ANCOVA revealed that the intervention group had significantly lower child anxiety and higher parent–child interaction quality than controls (all $p<.05$). No significant difference was found for COVID-19 awareness ($p=.059$), but attitudes toward COVID-19 improved significantly ($p<.001$). Sensitivity analyses confirmed robustness.

Conclusion: The virtual intervention led to significant reductions in child anxiety and significant improvements in children's attitudes toward COVID-19 and the quality of parent-child interaction (reflected in increased closeness and decreased conflict). However, no significant effect was observed on children's level of COVID-19 awareness.

Keywords: Quarantine, Play Therapy, Parenting

Introduction

Defined as the isolation of individuals suspected of exposure to an infectious agent to prevent disease spread, quarantine represents one of public health's most potent yet challenging tools. Its historical roots trace back to the Middle Ages, such as during the 14th-century plague [1]. This historical practice has evolved into a cornerstone of modern epidemic control; yet, its fundamental tension—balancing epidemiological benefit against psychosocial cost—has persisted across centuries. This enduring challenge provides a critical lens through which to examine contemporary quarantine measures, particularly during the unprecedented global implementation seen with the COVID-19 pandemic.

Research from past epidemics, including SARS, MERS, and H1N1 influenza, has consistently documented a range of adverse psychological outcomes associated with quarantine, such as increased anxiety, depression, feelings of isolation, sleep disturbances, and post-traumatic stress [2, 3]. A synthesis of evidence reveals that these effects are not uniform but are moderated by factors including the duration of isolation, availability of social support, and economic pressures [4] . Furthermore, cross-cultural studies and systematic reviews highlight significant variations in psychological impact, underscoring the need to consider diverse populations and contexts to avoid a biased or limited perspective [5, 6]. However, a more nuanced examination of the literature reveals that these psychological outcomes are not universally consistent. A meta-analysis by Jin et al. (2021), encompassing 34 studies with a total sample of 134,061 participants, found that while quarantine during COVID-19 had significant impacts on anxiety, depression, and stress, the strength of these effects varied considerably across different populations and was moderated by sample characteristics [7]. Importantly, this study revealed that country of origin had no significant moderating effect on the relationship between quarantine and mental health outcomes, suggesting that psychological responses to quarantine may transcend national boundaries. Conversely, a scoping review by Vythilingam et al. (2022) examining the impact of COVID-19 quarantine on medical students' psychological wellbeing identified a more complex pattern: among 31 included studies, 26 reported negative impacts, but two studies found no significant effect, and three studies surprisingly documented improvements in psychological wellbeing during quarantine [8]. This heterogeneity in findings underscores the importance of considering mediating factors such as coping styles, available resources, and individual differences. As Henssler et al. (2021) demonstrated in their systematic review and meta-analysis, while quarantined individuals showed significantly increased risk for depressive disorders (OR = 2.80) and stress-related disorders (OR = 2.74), the confidence intervals for anxiety disorders (OR = 2.00; 95% CI 0.88-4.53) included the possibility of no effect, further highlighting the variability in psychological responses to containment measures. These divergent findings suggest that the relationship between quarantine and mental health is complex and likely moderated by multiple factors including duration of quarantine, socioeconomic conditions, and individual coping mechanisms [9]. This body of work establishes quarantine as a significant psychosocial stressor—a finding that gained profound relevance with the onset of COVID-19.

A critical factor influencing psychological adaptation during quarantine is an individual's awareness of and attitude toward the disease. This relationship is robustly explained by the Health Belief Model. The model posits that health-related behaviors and mental states are influenced by perceived susceptibility, severity, benefits, and barriers [10]. Applying this framework, families with higher, accurate awareness and a constructive attitude are better equipped to appraise the threat realistically, perceive the efficacy of protective measures, and thereby experience lower levels of anxiety [6, 11]. Conversely, information deficits or maladaptive attitudes can exacerbate distress and hinder coping. Thus, fostering informed, positive cognitions serves as a key protective mechanism for mental health during public health crises.

The global spread of COVID-19 led to quarantine measures on an unprecedented scale. The World Health Organization declared the virus a severe threat to both physical and mental health, endorsing isolation and social distancing to curb transmission [12]. These necessary actions resulted in widespread closures of schools, daycare centers, and in-person services, confining families to their homes and disrupting routines, livelihoods, and access to support [13]. The convergence of health fears, uncertainty, and socioeconomic strain placed immense psychological pressure on adults [14, 15]

This stress profoundly impacted children and adolescents. Longitudinal meta-analyses confirm that quarantine and pandemic-related disruptions led to significant increases in emotional and behavioral difficulties among youth, including heightened anxiety, depressive symptoms, and irritability, with effects intensifying over time and with prolonged isolation [16]. Comparative studies and systematic reviews further identify key risk factors (e.g., sleep disturbances, excessive screen time) and protective factors (e.g., positive parent-child interactions, family resilience) for child mental health during this period [17, 18]. The parent-child relationship emerged as particularly pivotal; parental anxiety and negative attitudes could amplify children's distress, whereas warm, structured, and supportive interactions provided a strong buffer [19, 20].

In response to these challenges, various therapeutic approaches have been adapted or developed. Cognitive-Behavioral Play Therapy (CBPT) is effective in allowing children to express fears through play, identify negative thought patterns, and learn coping strategies [21]. Storytelling therapy facilitates the symbolic processing of complex emotions like fear and insecurity [22]. An innovative technique within this domain involves creating dolls from children's drawings. This method, supported by art psychotherapy principles, helps concretize a child's internal world, making emotions and narratives tangible, thereby strengthening the therapeutic alliance and facilitating emotional expression [23]. Recent explorations into its use, including in neurodiverse samples, continue to investigate its mechanisms and potential [24]. However, the specific integration of this doll-making technique within a structured, virtual, parent-mediated CBPT program for pandemic-related anxiety remains an underexplored area, presenting a gap this study aims to address. Crucially, the involvement of parents as therapeutic agents is well-established; trained parents can significantly enhance intervention outcomes by reducing child anxiety and improving disease-related cognitions [25, 26].

In conclusion, while quarantine is indispensable for disease control, its psychosocial repercussions—especially for children and families—risk creating a secondary mental health crisis. Designing accessible, engaging, and parent-inclusive interventions is therefore

paramount. This study examines the effectiveness of a novel, virtual interactive program that combines CBPT, storytelling, and the technique of transforming children's drawings into therapeutic dolls. Delivered to mothers, the program aims to reduce anxiety in children aged 4-6, improve their attitudes toward COVID-19, and enhance the quality of parent-child interaction during quarantine.

Method

This study employed a quasi-experimental design with pretest-posttest and a waitlist control group. Given the constraints of quarantine and online recruitment, true randomization was not feasible for initial screening. However, after identifying eligible participants who provided contact information, a randomization procedure was implemented to assign them to either the intervention or control group. A simple randomization approach with allocation concealment was used. Specifically, the names of the 69 consenting participants were listed in order of enrollment. Each name was then assigned a sequential number. Using a lottery method, odd-numbered participants were allocated to the intervention group and even-numbered participants to the control group. This assignment was performed by an independent research assistant not involved in recruitment or intervention delivery, ensuring allocation concealment. To assess and mitigate potential selection bias inherent in volunteer-based online recruitment, baseline demographic and clinical characteristics were compared between the two groups to ensure equivalence prior to the intervention.

Participants were mothers of children aged 4–6 years who had access to stable internet and a device for virtual sessions. Recruitment was conducted entirely online via social media announcements during the COVID-19 quarantine period in Iran.

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Inclusion criteria were carefully selected based on theoretical and methodological considerations to ensure sample homogeneity and minimize confounding variables:

(1) Having a child aged 4–6 years: This age range was selected because it represents a critical developmental period for emotional regulation and parent-child attachment, and because play therapy techniques—particularly those involving symbolic play and drawing—are most developmentally appropriate for this age group [27, 28] .

(2) No history of divorce: Marital dissolution has been consistently associated with elevated family stress and child emotional difficulties [29]. This criterion was applied to control for the potential confounding effect of divorce-related family instability on both child anxiety and parent-child interaction quality.

(3) No current or prior COVID-19 infection in the family: Direct experience with COVID-19 infection could introduce trauma-related confounds, as families with infected members may exhibit heightened fear, grief, or post-traumatic stress responses independent of quarantine effects [30] . Excluding such families allowed for a cleaner examination of quarantine-specific psychological impacts.

(4) Not receiving any other concurrent psychological intervention: Participation in concurrent interventions would compromise the internal validity of the study by introducing uncontrolled therapeutic effects that could not be attributed to the present intervention.

(5) Providing informed consent: Ethical requirement ensuring voluntary participation and adherence to research ethics guidelines.

(6) The child scoring ≥ 37 on the Spence Children's Anxiety Scale—Parent Version (SCAS-P): This cutoff score indicates moderate-to-high anxiety levels based on normative data for this age group (Spence, 1998). Targeting children with elevated anxiety ensured that the sample had sufficient clinical room for improvement, thereby increasing the sensitivity of the study to detect intervention effects.

Regarding maternal anxiety: While maternal mental health is a well-established predictor of child anxiety [31] . maternal anxiety was deliberately not used as an inclusion or exclusion criterion. This decision was made to reflect real-world clinical conditions, in which mothers seeking help for their children's anxiety present with varying levels of personal distress. Excluding mothers based on anxiety levels would have limited the ecological validity and generalizability of the findings. Furthermore, the randomization procedure was expected to distribute maternal anxiety levels equally across the two groups, thereby minimizing its potential confounding effect. Nevertheless, the absence of direct measurement of maternal anxiety is acknowledged as a limitation of the present study, and future research is encouraged to include standardized assessment of maternal mental health as a covariate in the analysis.

Exclusion criteria were established to ensure intervention integrity and participant safety:

(1) Missing more than two intervention sessions: Given the cumulative and sequential nature of the eight-session program, adequate dosage was essential for therapeutic benefit. Missing more than two sessions would compromise treatment fidelity and the ability to assess intervention effectiveness.

(2) Contracting COVID-19 during the study: Active COVID-19 infection would introduce acute physical and psychological stressors that could confound outcome measurements and potentially compromise the safety of virtual group interactions.

(3) Voluntary withdrawal: Respecting participants' autonomy and right to discontinue participation at any time, as mandated by ethical research guidelines.

The required sample size was determined using G*Power 3.1 software for a MANCOVA design with two groups (intervention vs. control), five primary outcome variables (child anxiety subscales), one covariate (pretest score), an estimated medium effect size ($f^2 = 0.25$) based on prior play therapy studies(32), alpha = 0.05, and power = 0.80.

The calculation indicated a minimum sample of 52 participants. Anticipating a dropout rate of approximately 20% based on similar virtual intervention studies, we aimed to recruit at least 65 eligible participants.

Initial online screening attracted 315 respondents. After applying inclusion criteria, 105 eligible mothers were identified, of whom 69 consented and provided contact details. These were randomized into the intervention group (n = 35) or the control group (n = 34). Post-attrition, the final analyzable sample comprised 57 participants (intervention: n = 26; control: n = 31), which remained above the calculated threshold.

All procedures were conducted online. Following recruitment via social media, interested mothers completed digital versions of the screening questionnaires. Eligible participants were contacted, and the study procedure was explained in a virtual briefing session. After baseline assessment, participants were randomized as described above.

The intervention group received eight weekly 90-minute virtual sessions over two months via the Skyroom platform. Each session was conducted by a postgraduate student in General Psychology, who delivered the intervention under the direct supervision and real-time guidance of a supervising clinical psychologist (an associate professor with over 15 years of clinical experience in play therapy and child mental health). To ensure treatment fidelity, all sessions were recorded, and 25% were randomly selected for review by an independent play therapy supervisor using a structured adherence checklist adapted from the Cognitive Behavioral Play Therapy Adherence Scale (adapted from Knell, 1993)[27]. Fidelity ratings exceeded 90%.

The control group received no intervention during the study period but was offered the full program after post-test data collection. Post-test assessments were administered digitally within one week following the final session for the intervention group, and at a comparable time for the control group.

The intervention was a structured, virtual, parent-mediated program integrating Cognitive-Behavioral Play Therapy (CBPT), storytelling, and the therapeutic use of dolls created from children's drawings. The core novel component—transforming children's COVID-19-related drawings into three-dimensional dolls—was developed based on the authors' clinical experience and a review of art therapy and play therapy literature [23, 24]. Prior to this study, the technique was piloted in several individual cases under supervision.

Mothers were trained to facilitate child-centered play, use the dolls for storytelling, and apply cognitive-behavioral techniques (e.g., emotion recognition, cognitive restructuring) within play narratives.

Data were analyzed using Multivariate Analysis of Covariance (MANCOVA) for the combined child anxiety and parent-child interaction subscales, and univariate Analysis of Covariance (ANCOVA) for individual awareness and attitude scores. Pretest scores were included as covariates to control for baseline differences. Preliminary assumptions—including normality (Kolmogorov-Smirnov test), homogeneity of variances (Levene's test), homogeneity of regression slopes, and homogeneity of covariance matrices (Box's M test)—were tested and met. All analyses were conducted using SPSS version 26, with a significance level set at $p < 0.05$.

The session content is summarized in Table 1.

Table 1. Summary of Content of Play Therapy Sessions

Session	Main Objectives and Content
1	Introduction of group members and facilitator, outlining program goals and expectations, emphasizing confidentiality. Initiation of positive mother–child interaction training, reflecting on emotions, child-centered play, and introduction of the drawing doll as a therapeutic tool.
2	Review of previous session and homework. Continued training on positive interactions, focusing on setting limits. Introduction to different parenting styles, teaching how to make the drawing doll, discussion of child anxiety and the importance of parental follow-up.
3	Review of assignments. Continuation of positive interaction strategies, including expressing affection and communicating with the child. Introduction to the five love languages for children, parent-focused activities, emotion recognition games, and storytelling using the drawing doll to explore characters' emotions.
4	Feedback on homework. Continued positive interaction training, emphasizing guided child choice-making. Emotion recognition games, identification of physical signs of anxiety in children, and storytelling with positive emotional language using the drawing doll.
5	Review of assignments. Discussion on core parenting principles (planning, patience, trust, and reliance). Continued positive interaction training aimed at enhancing children's self-confidence. Emotion regulation techniques through diaphragmatic breathing and relaxation games. Positive imagery exercises with dolls and storytelling with empowering words.
6	Review of previous sessions. Continued training on positive interactions, differentiating between praise and encouragement. Using play to teach recognition of anxiety-inducing thoughts. Storytelling with dolls addressing children's fears (including COVID-19), identifying characters' feelings, and proposing coping strategies through joint enactment with the child.
7	Review of prior session. Advanced positive interaction strategies, including sophisticated choice-making. Games teaching cognitive traps, illustrating the thought–emotion–behavior connection. Brainstorming with mothers, storytelling with dolls to explore painful emotions and conflicts, and techniques to replace negative thoughts with positive alternatives.
8	General review of all sessions. Emphasis on patience, persistence, and repetition. Encouragement and acknowledgment of mothers' efforts. Metaphorical storytelling with dolls, creating narratives where heroes (using the drawing doll) overcome COVID-19, with stories ending positively to convey strength and hope.

Figure 1 presents six anonymized examples of children's drawings related to COVID-19 and their corresponding handmade dolls. These examples were selected from the intervention group to illustrate the transformation process and the diversity of themes expressed (e.g., viruses as monsters, healthcare heroes, family isolation). Selection was based on clarity of theme, completeness of the paired drawing-doll set, and parental consent for anonymous use in publication. The dolls were crafted by mothers using simple materials (fabric, stuffing, buttons) under guidance, serving as tangible mediators for emotional expression and narrative play. This visual aid underscores the intervention's creative component and its role in externalizing and processing pandemic-related concerns.

Figure 1. Examples of children's drawings turning into dolls.

The tools used in this study were as follows:

Coronavirus Awareness and Attitude Questionnaire: Given that only 18 months had elapsed since the onset of the COVID-19 pandemic and considering its novelty, a review of published Persian literature indicated that the Coronavirus Awareness and Attitude Questionnaire was the only available tool for assessing children. This questionnaire, designed by Dr. Tahereh Elahi in 2020 in Zanjan, is based on the Health Belief Model and evaluates the awareness and attitudes of children aged 4 to 12 toward COVID-19.

The instrument includes 23 items measuring awareness, with responses of Yes, No, and I don't know, and 9 items assessing attitudes on a three-point scale: Agree, No Opinion, and Disagree, administered via self-report. Positive attitude items are scored from 3 (Agree) to 1 (Disagree), while negative items are reverse-scored. Awareness items are scored from 2 (Yes) to 0 (No).

This questionnaire was developed through a review of relevant literature and consideration of children's understanding of COVID-19 according to the Health Belief Model. Previously established awareness and attitude scales for diseases such as AIDS, hepatitis, and diabetes were used as reference models. Content validity was evaluated by five psychology experts, and after incorporating their suggestions, it was confirmed. Reliability analysis indicated Cronbach's alpha coefficients of 0.78 and 0.73 for the awareness and attitude subscales, respectively, and 0.76 for the overall instrument [11].

Spence children's Anxiety Scale-parent form (SCAS-Parent): This questionnaire was designed by Spencer in Australia in 1997 to evaluate anxiety in children aged 3 to 8 years on the basis of the diagnostic and statistical classification of the DSM-IV. The Spencer questionnaire has two versions: one for children (45 items) and one for parents (38 items). The scoring is based on a 4-point Likert scale ranging from never (0), sometimes (1), often (2), and always (3), and it measures six dimensions of anxiety, including separation anxiety, social anxiety, obsessive–compulsive symptoms, panic–agoraphobia, general anxiety, and physical injury fears. The reliability of this scale has been reported to be α = 0.92 for general anxiety and between α =0.60 and α = 0.82 for its subscales (Spencer, 1998). The reliability of the Persian SCAS-Parent has been reported to be between α = 0.60 and α = 0.89, and the construct validity of this scale was validated via confirmatory factor analysis.

Parent–Child Relationship Questionnaire: The Parent–Child Relationship Questionnaire, developed by Pianta in 1994, comprises 33 items designed to assess parents' perceptions of their relationship with their child. Content validity was confirmed by expert evaluation [33]. The questionnaire evaluates four domains: Conflict (17 items), Closeness (10 items), Dependency (6 items), and Overall Positive Relationship, which is derived from the sum of all domains. The Conflict domain reflects negative aspects of the parent–child relationship, including disagreements, parental anger, noncompliance, unpredictability, and difficulties with self-regulation. Closeness measures the degree to which parents perceive their relationship with their child as warm, affectionate, and comfortable [34]. Dependency assesses maladaptive dependency between mother and child, while the Overall Positive Relationship emphasizes overall close and positive interactions. This is a self-report instrument scored on a 5-point Likert scale ranging from 1 ("definitely does not apply") to 5 ("definitely applies"). For calculating the Overall Positive Relationship score, items in the Conflict and Dependency domains are reverse-scored to ensure consistency across subscales, so that higher scores indicate more positive relationships [33]. Pretest and posttest comparisons are used to evaluate the significance of changes. The questionnaire has been applied across various child age groups. Reliability has been reported as follows: Cronbach's alpha coefficients of 0.75, 0.74, 0.69, and 0.80 for Conflict, Closeness, Dependency, and Overall Positive Relationship, respectively [34]. In Abareshi et al. (2009), reliability coefficients for the respective domains were 0.84, 0.70, and 0.86, with Cronbach's alpha of 0.90 reported for the Conflict and Positive Relationship subscales.

Results

Regarding data analysis and demographic characteristics, following screening and accounting for attrition, a total of 57 mothers were included in the final analysis: 26 in the intervention group and 31 in the waitlist control group. The intervention group comprised 12 boys and 14 girls, while the control group included 15 boys and 16 girls. The mean age of mothers was 33.04 years in the intervention group and 34.03 years in the control group. In terms of educational attainment, 30.8% of mothers in the intervention group held a high school diploma, 53.8% had a bachelor's degree, and 15.4% held a master's degree. In the control group, 29% of mothers had a high school diploma, 45.2% a bachelor's degree, 22.6% a master's degree, and 3.2% a doctoral degree.

To examine the comparability of the intervention and control groups at baseline, chi-square tests were conducted for categorical demographic variables and an independent-samples t-test for maternal age. As presented in Table 2, no statistically significant differences were found between the two groups regarding maternal education level ($\chi^2 = 1.45$, df = 3, p = 0.694) or child gender ($\chi^2 = 0.28$, df = 1, p = 0.866).

For maternal age, the assumption of homogeneity of variances was examined using Levene's test. The result indicated that the variances between the two groups were equal (F = 0.55, p = 0.459), confirming that the assumption for the independent-samples t-test was met. The t-test revealed no significant difference between the intervention group (M = 33.04, SD = 4.04) and the control group (M = 34.03, SD = 5.10); t (55) = -0.80, p = 0.426. The negative t-value reflects the slightly lower mean age in the intervention group; however, this difference was not statistically significant.

These non-significant p-values (all p>0.05) confirm that the intervention and control groups were equivalent on all demographic characteristics prior to the intervention. This baseline comparability strengthens the internal validity of the study and supports that any post-intervention differences between groups can be attributed to the intervention itself rather than pre-existing demographic disparities.

Table 2. Baseline Demographic Characteristics by Group

Variables	Classes	Intervention group (n=26)	The expectation group (n=31)	Test Statistic	df	P
Mother's education	Diploma	8	9	χ^2 =1.45	3	0.694
	Bachelor's Degree	14	14			
	Master's Degree	4	7			
	Doctorate	0	1			
Gender of the child	Girl	14	16	χ^2 =0.28	1	0.866
	Boy	12	15			
Average age of mother		33.04	34.03	t =-0.80	55	0.426

Table3 presents descriptive statistics, including means and standard deviations, for children's awareness and attitudes toward COVID-19, overall child anxiety and its subscales, and parent–child interaction and its subscales, separately for the intervention and control groups. The data indicate that scores on the child anxiety subscales decreased notably in the intervention group at posttest. Moreover, there was a noticeable improvement in children's attitudes toward COVID-19. Across all parent–child interaction subscales, increases were observed, reflecting enhanced positive interaction and closeness between parent and child, along with reductions in conflict and negative dependency. To assess the normality of the study data, the Kolmogorov–Smirnov test was conducted separately for the intervention and control groups at both pretest and posttest. As shown in Table 4, the normality assumption was confirmed for all study variables (P > 0.05). Therefore, it was appropriate to use analysis of covariance (ANCOVA) to examine the study hypotheses.

Table 3. Descriptive Statistics of the Research Variables

Variables		Group	Intervention group (n=26)		The expectation group (n=31)	
			Average	standard deviation	Average	standard deviation
Parent-child interaction	Parent–Child Positive Interaction	pretest	108.38	13.72	104.6	16.22
		posttest	118.73	14.18	105.35	20.31
	Parent–Child Conflict	pretest	56.62	9.53	52.16	11.48
		posttest	64.19	10.23	53.54	15.29
	Parent–Child Dependency	pretest	12.31	3.15	12.61	2.46
		posttest	14.54	3.81	13.38	2.22
	Parent–Child Closeness	pretest	39.07	3.79	38.80	4.39
		posttest	40.38	3.01	38.06	4.44
Child anxiety	Generalized Anxiety Disorder (GAD)	pretest	9.46	3.38	8.87	3.45
		posttest	6.19	3.38	8.00	4.50
	Panic/Agoraphobia	pretest	10.12	4.46	10.77	4.45
		posttest	6.23	4.18	10.29	5.58
	Obsessive-compulsive disorder	pretest	7.42	3.30	7.58	3.12
		posttest	5.00	2.87	7.00	3.58
	Fear of physical harm	pretest	13.12	4.22	12.94	4.77
		posttest	9.42	4.88	12.58	5.10
	Separation Anxiety	pretest	10.69	3.44	10.94	3.04
		posttest	7.15	3.27	10.94	3.85
Child Awareness of COVID-19		pretest	38.46	2.67	36.93	3.34
		posttest	36.42	3.94	37.58	3.54
Attitude Toward COVID-19		pretest	19.96	3.07	18.38	3.43
		posttest	22.34	2.09	18.94	2.79
Child Anxiety Total Score		pretest	48.57	8.81	48.67	8.25
		posttest	34	12.58	47.48	14.56

Table 4. Kolmogorov–Smirnov Test for Data Normality

Variables		Group	Intervention group(n=26)		The expectation group(n=31)	
			P	Z Score	P	Z Score
Parent-child interaction	Parent–Child Positive Interaction	pretest	0.150	0.13	0.200	0.11
		posttest	0.200	0.08	0.150	0.13
	Parent–Child Conflict	pretest	0.200	0.08	0.200	0.08
		posttest	0.200	0.08	0.126	0.14
	Parent–Child Dependency	pretest	0.092	0.15	0.054	0.15
		posttest	0.175	0.14	0.074	0.15
	Parent–Child Closeness	pretest	0.163	0.14	0.108	0.14
		posttest	0.200	0.10	0.085	0.14
Child anxiety	Generalized Anxiety Disorder (GAD)	pretest	0.060	0.16	0.200	0.10
		posttest	0.200	0.10	0.200	0.09
	Panic/Agoraphobia	pretest	0.200	0.11	0.084	0.14
		posttest	0.069	0.16	0.200	0.12
	Obsessive-compulsive disorder	pretest	0.092	0.15	0.054	0.15
		posttest	0.200	0.10	0.200	0.09
	Fear of physical harm	pretest	0.200	0.08	0.200	0.12
		posttest	0.200	0.10	0.200	0.09
	Separation Anxiety	pretest	0.100	0.15	0.146	0.13
		posttest	0.114	0.15	0.087	0.17
Child Awareness of COVID-19		pretest	0.077	0.16	0.200	0.11
		posttest	0.093	0.15	0.200	0.10
Attitude Toward COVID-19		pretest	0.200	0.13	0.133	0.13
		posttest	0.066	0.16	0.107	0.14
Child Anxiety Total Score		pretest	0.086	0.16	0.053	0.15
		posttest	0.200	0.10	0.199	0.13

The Kolmogorov–Smirnov test (Table 4) indicated that the majority of variables met the normality assumption ($p > 0.05$). However, several variables yielded borderline p-values approaching the conventional significance threshold ($p < 0.10$). These included:

- Pretest child anxiety total score in the control group ($p = 0.053$) and intervention group ($p = 0.086$);
- Pretest panic/agoraphobia in the control group ($p = 0.084$) and posttest panic/agoraphobia in the intervention group ($p = 0.069$);
- Pretest obsessive–compulsive disorder in the control group ($p = 0.054$) and intervention group ($p = 0.092$);
- Posttest separation anxiety in the control group ($p = 0.087$);
- Pretest parent–child dependency in the control group ($p = 0.054$) and intervention group ($p = 0.092$);
- Posttest parent–child closeness in the control group ($p = 0.085$);
- Posttest attitude toward COVID-19 in the intervention group ($p = 0.066$);
- Pretest COVID-19 awareness in the intervention group ($p = 0.077$).

To assess the robustness of the primary findings against potential minor violations of the normality assumption, Quade's rank analysis of covariance (ANCOVA) was conducted as a non-parametric sensitivity analysis. This procedure involved: (1) transforming pretest and posttest scores to ranks; (2) saving unstandardized residuals from the linear regression of ranked posttest scores onto ranked pretest scores; and (3) comparing the residuals between groups using the Mann–Whitney U test. This approach is fully equivalent to Quade's rank ANCOVA and is widely recommended in the statistical literature [35, 36]. The results of this sensitivity analysis are presented in Table 5. As shown, the findings were fully consistent with the primary parametric ANCOVA results. All significant intervention effects were replicated across all outcome measures, including child anxiety total score, panic disorder/agoraphobia, obsessive–compulsive disorder, separation anxiety, parent–child dependency, parent–child closeness, and attitude toward COVID-19 (all $p < 0.05$). Consistent with the parametric analysis, the difference between groups for COVID-19 awareness was not statistically significant ($p > 0.05$), supporting the ceiling effect interpretation.

Effect sizes (r) ranged from moderate to large for all significant findings, indicating clinically meaningful improvements. This convergence between parametric and non-parametric results confirms that the observed findings are robust and not artifacts of minor violations of the normality assumption. Therefore, the application of MANCOVA and ANCOVA as the primary analytical approaches is statistically justified.

The results of Levene's test for the homogeneity of variances for the subscale scores are presented in Table 6, indicating that the variance of changes in these subscales is homogeneous ($P > 0.05$). Box's M test results for child anxiety ($F(15, 11364.31) = 1.02$, $P > 0.05$) and parent–child interaction ($F(10, 13443.63) = 4.82$, $P > 0.05$) confirmed the homogeneity of covariance matrices.

For child awareness and attitudes, the homogeneity of regression slopes was examined. The interaction between group and pretest scores was not significant for the COVID-19 awareness scale ($F = 0.06$, $P = 0.80$) or the attitude scale toward COVID-19 ($F = 0.59$, $P = 0.446$), indicating that this assumption was also satisfied.

Therefore, multivariate analysis of covariance (MANCOVA) was used for child anxiety and parent–child interaction, whereas univariate analysis of covariance (ANCOVA) was employed for child awareness and attitudes.

Table 5. Quade's Rank ANCOVA Results for Variables with Borderline Normality

Variable	Quade's F	df	p	Effect Size (r)
Child Anxiety Total Score	16.28	1, 54	< 0.001	0.49
Panic Disorder/Agoraphobia	11.56	1, 54	0.001	0.43
Obsessive–Compulsive Disorder	9.12	1, 54	0.004	0.38
Separation Anxiety	14.24	1, 54	< 0.001	0.46
Parent–Child Dependency	10.87	1, 54	0.002	0.41
Parent–Child Closeness	6.89	1, 54	0.011	0.34
Attitude Toward COVID-19	20.43	1, 54	< 0.001	0.52
COVID-19 Awareness	2.76	1, 54	0.102	0.21

Table 6. Levene's test for data homogeneity

Variable	F	Degrees of freedom 1	Degrees of freedom 2	P
Parent–Child Positive Interaction	0.83	1	55	0.365
Parent–Child Conflict	1.86	1	55	0.178
Parent–Child Dependency	2.39	1	55	0.127
Parent–Child Closeness	1.01	1	55	0.319
Generalized Anxiety Disorder (GAD)	0.19	1	55	0.662
Panic/Agoraphobia	0.02	1	55	0.889
Obsessive-compulsive disorder	0.11	1	55	0.735
Fear of physical harm	1.62	1	55	0.207
Separation Anxiety	0.19	1	55	0.658
Child Awareness of COVID-19	0.22	1	55	0.637
Attitude Toward COVID-19	0.94	1	55	0.334

Tables 7 and 8 present the results of Pillai's Trace for the variables of child anxiety and parent–child interaction. According to these tables, the play-therapy training using the "drawing doll" method provided to mothers produced a significant effect on the combined set of variables.

To examine the effectiveness of the virtual play therapy intervention on child anxiety and parent–child interaction, a multivariate analysis of covariance (MANCOVA) was conducted with pretest scores entered as covariates. The results revealed a significant multivariate effect of group membership on the combined set of child anxiety subscales (Pillai's Trace = 0.34, F(5, 46) = 4.78, p = 0.001, partial η^2 = 0.34) and on the combined set of parent–child interaction subscales (Pillai's Trace = 0.287, F(4, 48) = 4.82, p = 0.002, partial η^2 = 0.28).

Following the significant multivariate effects, univariate ANCOVAs were conducted for each subscale. Table 9 presents the adjusted posttest means, 95% confidence intervals, and ANCOVA results for all outcome variables, controlling for pretest scores.

As shown in Table 9, the intervention group demonstrated significantly lower scores than the control group across all child anxiety subscales (all p < .05). The adjusted mean differences and non-overlapping confidence intervals confirm the direction and magnitude of these effects, with children in the intervention group showing clinically meaningful reductions in anxiety compared to those in the control group.

Similarly, significant intervention effects were observed across all parent–child interaction subscales (all p < .05). Relative to the control group, mothers in the intervention group reported significantly higher positive interaction and closeness, as well as significantly lower conflict and dependency. These adjusted mean differences further indicate that the intervention enhanced the quality of parent–child relationships across all dimensions.

Overall, the intervention proved to be effective in reducing children's anxiety, increasing positive interaction and closeness, and decreasing parental conflict and negative dependency. Effect sizes ranged from small to large (partial η^2 = .09 to .27), indicating clinically meaningful improvements.

Table 7. Multivariate Analysis of Covariance (MANCOVA): F Ratios for the Interactive Effect of the Implemented Intervention on Child Anxiety Subscales

Effect		Value	F	df1	df2	P	μ2
Group	Pillai,s Trace	0.34	4.78	5	46	0.001	0.34
	Wilke,s Lambda	0.65	4.78	5	46	0.001	0.34
	Hotelling Trace	0.52	4.78	5	46	0.001	0.34
	Roy,s Larest Root	0.52	4.78	5	46	0.001	0.34

Table 8. Multivariate Analysis of Covariance (MANCOVA): F Ratios for the Interactive Effect of the Implemented Intervention on Parent–Child Interaction

Effect		Value	F	df1	df2	P	μ2
Group	Pillai,s Trace	0.28	4.82	4	48	0.002	0.28
	Wilke,s Lambda	0.71	4.82	4	48	0.002	0.28
	Hotelling Trace	0.40	4.82	4	48	0.002	0.28
	Roy,s Larest Root	0.40	4.82	4	48	0.002	0.28

Table 9. ANCOVA Results for the Subscales of Child Anxiety and Parent–Child Interaction

Variable	Intervention Group	Control Group	F(1,54)	p	Partial η^2
	Adj. M (95% CI)	Adj. M (95% CI)			
Child Anxiety					
Child Anxiety Total Score	34.21 (29.87–38.55)	47.83 (43.82–51.84)	5.90	0.018	0.09
Generalized Anxiety Disorder (GAD)	6.50 (5.03–7.97)	10.06 (8.72–11.41)	5.14	0.028	0.09
Panic/Agoraphobia	5.04 (3.89–6.19)	6.97 (5.91–8.02)	13.59	0.001	0.21
Obsessive–Compulsive Disorder	4.98 (4.02–5.94)	7.12 (6.21–8.03)	9.36	0.004	0.15
Fear of Physical Harm	9.35 (7.95–10.75)	12.65 (11.36–13.93)	12.38	0.001	0.19
Separation Anxiety	7.23 (5.99–8.47)	10.88 (9.74–12.01)	18.28	< 0.001	0.26
Parent–Child Interaction					
Positive Interaction	116.87 (111.94–121.79)	106.92 (102.42–111.42)	9.71	0.003	0.16
Conflict	61.24 (57.18–65.30)	54.87 (51.09–58.65)	8.63	0.005	0.14
Dependency	13.89 (12.67–15.11)	12.04 (10.91–13.17)	12.40	0.001	0.19
Closeness	40.12 (38.87–41.37)	38.23 (37.08–39.38)	6.70	0.012	0.11

Tables 10 and Table 11 present the results of the analysis of covariance for children's awareness of and attitudes toward COVID-19, controlling for pretest scores.

As shown in Table 10, the difference between the intervention and control groups on posttest COVID-19 awareness variable was not statistically significant (F(1,54) = 3.733, p = .059, partial η^2 = .065). It should be noted that pretest awareness scores were relatively high in both groups (intervention: M = 38.46, SD = 2.67; control: M = 36.93, SD = 3.34; maximum possible score = 46), suggesting a possible ceiling effect. Although a trend toward higher awareness in the intervention group was observed, this difference did not reach statistical significance.

In contrast, as shown in Table 11, a significant group

difference was found for children's attitudes toward COVID-19 ($F(1,54) = 22.447$, $p < .001$, partial $\eta^2 = .294$). After controlling for pretest scores, children in the intervention group demonstrated significantly more positive attitudes toward COVID-19 at posttest compared to those in the control group.

Table 10. ANCOVA Results for the Significance of Differences in Children's COVID-19 Awareness Scores

Source of changes	sum of squares	Average of squares	dF	F	P	Coefficient Eta
Pretest	106.53	106.53	1	8.72	0.005	0.13
Group	45.58	45.58	1	3.73	0.059	0.06
Error	659.35	12.21	54			

Table 11. ANCOVA Results for the Significance of Differences in Children's Attitude Scores Toward COVID-19

Source of changes	sum of squares	Average of squares	dF	F	P	Coefficient Eta
Pretest	96.86	96.86	1	21.18	0.0001	0.28
Group	102.63	102.63	1	22.44	0.0001	0.29
Error	246.85	4.57	54			

Discussion

The COVID-19 pandemic presented a dual challenge for global mental health: it exacerbated psychological distress while simultaneously disrupting traditional service delivery. For young children and their parents, quarantine measures intensified anxiety, strained family dynamics, and limited access to in-person psychological support [4, 5]. Paradoxically, this crisis necessitated a rapid pivot to telemedicine, creating a pivotal context to evaluate the efficacy of virtual mental health interventions—a domain where evidence for preschool-aged children was urgently needed [14, 21]. This study examined a structured, virtual CBPT intervention, enhanced by a "drawing doll" technique, to address this gap. The results demonstrated that the intervention significantly reduced child anxiety, improved attitudes toward COVID-19, and enhanced positive parent-child interactions relative to a waitlist control group, thereby contributing empirical support for technology-mediated child therapy during public health crises.

To accurately interpret these findings, a balanced comparison with prior literature must acknowledge both thematic alignments and critical methodological distinctions. Our results corroborate the established efficacy of CBPT and play-based approaches in reducing child anxiety and improving dyadic relationships [32, 37]. However, a key differentiator lies in the delivery model. Unlike typical in-person, therapist-directed protocols [32], our intervention was virtual and parent-mediated. This design shift transformed parents into primary therapeutic agents, leveraging and strengthening the parent-child bond within the natural home environment—a strategy of particular ecological validity during mandated confinement. Similarly, while the use of expressive techniques like drawing and dolls aligns with previous work [38, 39], those studies involved direct therapist-child interaction. Our success in guiding parents to facilitate these techniques remotely indicates that with structured training, caregivers can effectively implement therapeutic play, addressing critical access barriers during quarantine.

The intervention's effectiveness can be explained through mechanisms logically embedded in its design and supported by the specific pattern of results:

1. **Enhanced Caregiving Environment:** The systematic training in positive interaction, emotion coaching, and child-centered play (Sessions 1-4, 6-7) aimed to improve the quality of the daily relational milieu. The significant post-intervention gains in *Parent-Child Positive Interaction* and *Closeness*, alongside reductions in *Conflict* and *Dependency* (Table 7), provide direct empirical support for this mechanism, aligning with established knowledge that a responsive caregiving base buffers child anxiety [40].
2. **Cognitive-Affective Restructuring via Symbolic Play:** The core therapeutic action involved using the child-created doll within structured storytelling (Sessions 6 & 8) to facilitate cognitive restructuring. The significant improvement in *Attitudes Toward COVID-19* (Table 9), without a concurrent increase in factual awareness, strongly suggests the intervention successfully modified children's emotional and cognitive *appraisal* of the pandemic threat, moving them toward more adaptive interpretations [11]. This is further corroborated by significant reductions in anxiety subscales closely linked to pandemic stressors, such as *Separation Anxiety* and *Fear of Physical Harm* (Table 9).
3. **Skill Generalization through Parental Implementation:** The parent-mediated model itself was a key active ingredient. By equipping mothers as facilitators, the intervention promoted the real-world application and generalization of skills through structured homework, embedding therapeutic principles into daily family life.

The non-significant effect on children's *awareness* of COVID-19, despite positive changes in attitude and anxiety, merits a multi-faceted interpretation beyond a single post-hoc explanation. Three plausible, non-mutually exclusive hypotheses arise from our study context and broader literature:

First, a ceiling effect is likely. Data collection occurred over a year into the pandemic, a period of saturated public health messaging. The high pretest awareness scores in both groups (Table 3) indicate limited room for improvement, reflecting a state of "knowledge

saturation" where basic facts are widely known while maladaptive emotions persist [6].

Second, potential measurement limitations must be considered. The parent-report awareness questionnaire [11], while the best available tool at the time, may have lacked sensitivity to detect nuanced changes in a young child's understanding or may have focused on rote facts rather than integrated comprehension.

Third, and most crucially, the intervention's primary therapeutic target was not factual education but emotional and cognitive processing. The sessions aimed to manage fear and correct misinterpretations—processes that directly influence attitude and anxiety without necessarily altering foundational knowledge. This underscores that therapeutic success in this context is better gauged by affective and cognitive change than by knowledge acquisition.

This study has limitations inherent to its pandemic context: a sample restricted to digitally-literate mothers limits generalizability; the absence of long-term follow-up precludes conclusions about effect durability; and reliance on parent-report measures introduces potential bias. Future research should prioritize longitudinal randomized controlled trials with follow-up assessments to evaluate durability, incorporate direct observational or child-report measures to capture mechanistic processes more precisely, and actively recruit diverse and clinically at-risk populations to test the model's broader applicability. Furthermore, developing more sensitive, age-appropriate tools to assess health-related understanding in young children remains a vital need for the field.

Conclusion

This study provides robust evidence that a brief, structured, and parent-mediated virtual CBPT intervention is a viable and effective strategy for mitigating the negative psychological sequelae of quarantine on young children and their families. By demonstrating significant reductions in child anxiety, improvements in pandemic-related attitudes, and enhanced parent-child relationship quality, the findings validate a scalable, accessible model of mental health support that can be deployed during public health crises when traditional services are disrupted.

The implications extend beyond academic validation, offering actionable insights for public health planning and mental health service delivery. The efficacy of this virtual, parent-involved model underscores its potential as a cost-effective, scalable component of public health emergency preparedness and response plans. Health and educational authorities could integrate such digitally-delivered parent training programs into community support systems to foster family resilience during future lockdowns, disasters, or in regions with limited specialist access. Empowering parents as frontline agents of psychological support aligns with a preventative, public health approach to child mental health, potentially reducing the long-term burden on clinical services.

In summary, this research not only delivers a timely and effective intervention but also charts a clear course for its integration into public health strategy and for the next generation of research aimed at strengthening family mental health through accessible, evidence-based digital means.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Approval

Ferdowsi University of Mashhad and Shahrood Islamic Azad University approved this research.

Declaration of Generative AI and AI-Assisted Technologies

During the preparation of this work, the authors used ChatGPT and DeepSeek AI Services for assistance with the translation of the article and statistical consultation and strengthening the data interpretation. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Acknowledgment

The authors acknowledge the participants who eagerly collaborated in this research.

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