



Effectiveness of Mindfulness-Based Parenting Training on Mother–Child Interaction Quality and Behavior Problems in Boys with Mild Intellectual Disability: A Quasi-Experimental Study with Two-Month Follow-Up

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ARTICLE INFO	ABSTRACT
Article History: Received 2 August 2025 Received in revised form 11 October 2025 Accepted 23 November 2025 Available online 27 December 2025 Keywords: Mindfulness; Mindful parenting; Mother–child interaction; Behavior problems; Intellectual disability	Background and Aim: Mothers of children with intellectual disability experience high parenting stress, which can undermine mother–child interaction and is reciprocally linked with child behavior problems. This study examined the effectiveness of mindfulness-based parenting training on mother–child interaction quality and behavior problems in boys with mild intellectual disability. Method: In a quasi-experimental controlled design with a two-month follow-up, 30 mothers of boys attending special-education schools in Bengaluru were allocated by lottery to eight weekly 90-minute sessions of mindful parenting training ($n = 15$) or a no-intervention control group ($n = 15$). Interaction quality and child behavior problems (Child Behavior Checklist) were assessed at pretest, posttest and follow-up and analyzed with Welch t tests on change scores and ANCOVA. Results: The groups were equivalent at baseline. In the experimental group, interaction quality increased from 54.40 to 63.80 (63.20 at follow-up) and behavior problems decreased from 73.53 to 58.53 (61.87 at follow-up), whereas the control group changed little. Changes were significantly larger in the experimental group for both outcomes at posttest (interaction quality: $t(27.08) = 5.54, p < .001, g = 1.97$; behavior problems: $t(27.84) = -5.47, p < .001, g = -1.94$) and at follow-up, and ANCOVA confirmed these results (partial $\eta^2 = .50-.53$). Conclusion: Mindful parenting training was associated with better mother–child interaction and fewer mother-reported behavior problems, largely maintained at two months. Given the small sample, reliance on maternal report and effect sizes larger than those usually reported, these findings are preliminary and require confirmation in adequately powered randomized trials.

1. INTRODUCTION

1.1. Statement of the Problem

Because of limitations in cognitive, linguistic and adaptive functioning, children with intellectual disability are at greater risk than typically developing peers for emotional and behavioral problems such as aggression,

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oppositonality, self-stimulatory behavior and anxiety. Longitudinal evidence shows that children with developmental delay display higher levels of behavior problems from the preschool years onward and that these problems are accompanied by greater parenting stress [1]. Such problems not only disrupt the child's learning and social adjustment but also place a considerable psychological burden on the family, particularly on mothers, who in most families are the primary caregivers.

The quality of mother–child interaction is one of the most important factors moderating the course of the child's social–emotional development. Warm, sensitive and responsive interaction can offset part of the negative consequences of disability and foster adaptive behavior; however, such interaction requires that the mother have sufficient psychological capacity to read the child's cues and respond to them appropriately [2]. In other words, interaction quality depends not only on the child's characteristics but also, to a large extent, on the caregiver's psychological state.

Research shows that mothers of children with intellectual disability and developmental delay experience, on average, more parenting stress, and that child behavior problems predict this stress more strongly than the child's intellectual status itself [1, 3]. Chronic stress can reduce a mother's patience and flexibility, heighten her emotional reactivity and push her toward controlling or permissive interaction patterns—patterns that are ill-suited to a child who needs structure, predictability and emotional stability. Moreover, the relationship between child behavior problems and parental mental health is bidirectional: child behavior problems are associated with lower parenting self-efficacy and greater parental distress, which in turn undermines parenting quality [4]. The result is a cycle of conflict and tension in the mother–child relationship that is unlikely to be broken by behavioral skills training alone.

Identifying approaches that can simultaneously address the mother's psychological state and the quality of her interaction with the child is therefore a priority for researchers and rehabilitation practitioners. This priority is even greater in settings where support services for families of children with intellectual disability are limited and low-cost, group-based interventions are especially needed.

1.2. Mindfulness and Mindful Parenting

Mindfulness has been defined as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” [5]. Mindfulness training for parents aims to help them respond to their child's behavioral cues with presence and acceptance rather than being caught up in automatic emotional reactions. Unlike traditional parent training approaches, which mainly target the child's behavior directly, mindful parenting focuses on changing how parents perceive and respond to difficult parenting situations, thereby reducing interactional tension and increasing emotional co-regulation between parent and child [6]. Duncan et al. [7] conceptualized mindful parenting in terms of five components: listening with full attention, nonjudgmental acceptance of self and child, emotional awareness of self and child, self-regulation in the parenting relationship, and compassion for self and child.

1.3. Theoretical Framework

The mechanisms through which mindfulness affects parenting can be explained from several complementary theoretical perspectives. First, dual-process models distinguish between a fast, automatic, habit-based system and a slower, deliberate, reflective system [8]. Chronic parenting stress, especially in mothers of children with intellectual disability, increases the likelihood that automatic emotional responses—anger, frustration or withdrawal—will dominate. Mindfulness practice strengthens the capacity to observe inner experience and creates a space between stimulus (the child's challenging behavior) and response (the mother's reaction), allowing the mother to respond deliberately rather than react automatically [6]. Shapiro et al. [9] called this process “reperceiving”: a shift in perspective toward one's own internal experience, brought about by mindful intention, attention and attitude, which leads to improved self-regulation, cognitive and emotional flexibility, and fewer automatic reactions.

Second, attachment theory provides a framework for explaining the link between the mother's state of mind and the quality of her relationship with the child. According to Bowlby, the caregiver's availability and sensitive responsiveness create a “secure base” from which the child explores the world and regulates distress [10]. Extending this view, interpersonal neurobiology argues that a parent's mindful awareness of their own and the child's internal

states strengthens emotional attunement between the two [11]. A mother who responds mindfully to her child's emotional cues gives the child an experience of safety, of being seen and of being valued, which forms the basis for adaptive behavior [12]. This mechanism is particularly important for children who, because of cognitive and linguistic limitations, rely more heavily on the caregiver's nonverbal cues and emotional tone.

Third, in Bronfenbrenner's bioecological model, everyday mother–child interactions constitute the “proximal processes” of the family microsystem that serve as the primary engines of development [13]. Children with intellectual disability depend more heavily on their mother's nonverbal cues, tone of voice, facial expressions and emotional warmth. Lapses in maternal responsiveness (inattention, inconsistency or angry reactions) can therefore quickly be followed by increases in challenging behaviors such as aggression, oppositionality, self-injury and social withdrawal; conversely, the child's challenging behaviors also erode the mother's capacity for sensitive responding [4].

Fourth, social learning theory—specifically Patterson's coercive family process model—explains how children's negative behaviors and parents' negative, punitive responses reinforce each other to produce a self-perpetuating vicious cycle [14]. Dynamic systems approaches have shown that, with repetition, these coercive interaction patterns become stable “attractors” in the parent–child relationship that can only be changed by disrupting the automatic chain of action and reaction [15]. In families of children with intellectual disability, this cycle may be more intense and persistent because challenging behaviors are more frequent and children find corrective feedback harder to understand. An intervention that reduces the mother's negative reactivity and replaces it with calm, supportive responses may therefore intervene at a key point in this cycle.

Fifth, Abidin's model of the determinants of parenting behavior views parenting stress as a factor that shapes parents' perceptions of their own abilities and resources and thereby affects parenting behavior [16]. According to this model, a mother who perceives parenting demands as exceeding her coping resources is at risk of reduced sensitivity to her child's needs, excessive control or permissiveness, and diminished enjoyment of the relationship. Mindfulness can be regarded as an “upstream” intervention that modifies this pathway by changing the mother's relationship with the experience of stress rather than necessarily removing the stressors themselves [6, 7].

Taken together, these frameworks converge on a common point: improving mother–child interaction is difficult without attending to the mother's psychological state and emotion regulation capacity. The conceptual model of the present study therefore proposes that mindful parenting training improves mother–child interaction quality by increasing present-moment attention, nonjudgmental acceptance and reduced emotional reactivity in the mother, and that improved interaction is in turn associated with fewer child behavior problems. It should be noted that the present study did not directly test the mediating mechanisms of this model and examined only its final outcomes.

1.4. Previous Research

Internationally, numerous studies have examined the effectiveness of mindfulness-based interventions for parents of children with special needs. In one of the earliest studies in this area, Singh et al. [17] used a single-subject design to examine the effects of mindful parenting training with three mothers of children with developmental disabilities. After the intervention, the children's aggressive behavior decreased and their social behavior increased. The importance of this study lies in its demonstration that mindfulness training for the parent, without directly targeting the child's behavior, may be accompanied by favorable child outcomes through changes in the parent's interaction style. However, the very small sample and the absence of a control group limit its generalizability.

In a randomized pilot trial, Coatsworth et al. [18] integrated mindfulness components into a family-based program and found that the program was associated with improved mindful parenting, child management skills and parent–youth relationship quality. Among parents of children with developmental delays, Neece [19] randomized 46 parents to mindfulness-based stress reduction (MBSR) or a wait-list control and found that MBSR was associated with lower parental stress and depression and greater life satisfaction, and that the children of participating parents showed fewer behavior problems after the intervention, particularly attention problems and ADHD symptoms. Earlier, Minor et al. [20] reported that an MBSR program for caregivers of children with chronic conditions and disabilities was associated with reduced stress symptoms.

Alongside intervention studies, correlational research has examined the role of mindfulness in the relationship between child behavior problems and parental mental health. In a sample of 71 mothers and 39 fathers of children with autism, Jones et al. [21] found that psychological acceptance, general mindfulness and mindful parenting mediated the relationship between child behavior problems and maternal anxiety, depression and stress. In a cross-sectional study of 28 parents of children with autism spectrum disorder, Beer et al. [22] found that greater mindful parenting was associated with fewer depressive symptoms and less stress (but not less anxiety), and that more child behavior problems were associated with less mindful parenting; however, mindful parenting did not mediate the relationship between child behavior problems and parental distress in that study. Overall, these findings suggest that parental mindfulness may act as a protective factor, although its precise mechanism remains unclear.

Meta-analytic evidence, however, presents a more cautious picture. In a systematic review and meta-analysis, Burgdorf et al. [23] reported small pre–post effects of mindfulness interventions for parents on parenting stress ($g = 0.34$), an effect of $g = 0.44$ in controlled comparisons, and a small effect on youth psychological outcomes ($g = 0.27$). This is important because it indicates that the effects of these interventions on child outcomes, at least in the existing literature, are typically small to moderate, and claims of very large effects should be treated with caution and supported by strong inferential evidence. In addition, much of the research has focused on children with autism spectrum disorder or attention-deficit/hyperactivity disorder [21, 22, 24], and evidence on children with intellectual disability, particularly at primary-school age, is more limited.

In India, despite growing interest in mindfulness-based approaches in clinical settings, research on parents of children with intellectual disability remains scarce, and the available studies have been largely descriptive. For example, Gupta and Kaur [25] surveyed parents of children attending schools for children with intellectual disability in Chandigarh, Jalandhar and Ludhiana and found that these parents reported significantly greater stress than parents of typically developing children, with mothers reporting more mental stress than fathers. Such studies document the burden carried by mothers, but they did not test an intervention and did not examine mother–child interaction quality or child behavior problems.

1.5. Research Gap, Contribution and Aims

The literature reveals several gaps. First, most studies have focused on parental mental health outcomes (stress, depression and anxiety), and relationship-level outcomes (mother–child interaction quality) and child-level outcomes (behavior problems) have rarely been examined together [23]. Second, the available evidence comes mainly from children with autism or ADHD, and it is unclear to what extent it generalizes to children with intellectual disability without these comorbidities [24]. Third, Indian studies in this population, such as that of Gupta and Kaur [25], have mainly described mother-level outcomes such as parenting stress, and the effects of interventions on the mother–child relationship and child behavior have rarely been tested. Fourth, low-cost, group-based interventions that can be delivered within the existing structure of special-education schools have rarely been evaluated in the Indian cultural context.

The present study seeks to address part of these gaps. Its expected contributions are: (a) the simultaneous examination of relationship-level and child-level outcomes in a controlled design; (b) a focus on a relatively homogeneous population of boys with mild intellectual disability in special-education schools; and (c) an assessment of the maintenance of change over a two-month follow-up. Because of its small sample and quasi-experimental design, this is a preliminary study intended to provide initial evidence for the design of larger randomized trials rather than definitive evidence.

Accordingly, the aim of the present study was to examine the effectiveness of mindfulness-based parenting training on mother–child interaction quality and behavior problems in boys with mild intellectual disability. The hypotheses were as follows:

Hypothesis 1: Compared with the control group, mindfulness-based parenting training will increase mother–child interaction quality at posttest.

Hypothesis 2: Compared with the control group, mindfulness-based parenting training will reduce mother-reported child behavior problems at posttest.

Hypothesis 3: The changes in interaction quality and behavior problems in the experimental group will be maintained at the two-month follow-up.

2. METHOD

2.1. Design

The study used a quasi-experimental pretest–posttest design with a control group and a two-month follow-up [26]. The independent variable was mindfulness-based parenting training, and the dependent variables were mother–child interaction quality and child behavior problems. Assessments were conducted at three time points: before the intervention (pretest), immediately after the eighth session (posttest), and two months after the end of the intervention (follow-up). Although participants were allocated to groups by lottery, the design is considered quasi-experimental because of convenience sampling, the absence of prospective trial registration and the lack of assessor blinding.

2.2. Participants and Sampling

The population comprised all mothers of boys with mild (educable) intellectual disability enrolled in special-education schools in Bengaluru during the 2023–2024 academic year. The study was announced to mothers through the schools, and from among the volunteers, 30 eligible mothers were selected by convenience sampling and allocated by lottery to the experimental ($n = 15$) and control ($n = 15$) groups. Only boys were included in order to increase sample homogeneity and to control for the possible effect of child sex on patterns of behavior problems.

Inclusion criteria were: having a son with mild to moderate (educable) intellectual disability according to the diagnostic record held by the school; a child age within the range covered by the Child Behavior Checklist (6–18 years); the mother's ability to read and complete the questionnaires; no concurrent psychological intervention for the mother; and willingness to attend the sessions. Exclusion criteria were missing more than two sessions and failure to complete the questionnaires. No participant was excluded on these grounds, and all 30 mothers (15 per group) completed all three assessments; the analyses were therefore conducted on complete data from all participants.

A sample size of 15 per group was chosen on the basis of the minimum commonly recommended for experimental studies in the behavioral sciences [26]. A sensitivity analysis showed that, with this sample size, a two-tailed independent t test with $\alpha = .05$ and 80% power can detect effects of $d = 1.06$ or larger; the study is therefore underpowered to detect small and moderate effects and should be regarded as preliminary.

2.3. Measures

Mother–Child Interaction Quality Questionnaire. Mother–child interaction quality was measured with a researcher-developed questionnaire. Total scores range from 0 to 100, with higher scores indicating better interaction quality, including maternal warmth, sensitivity and responsiveness and the quality of emotional communication between mother and child. The questionnaire comprises 25 items rated on a five-point scale from 0 (never) to 4 (always). Content validity was confirmed by experts in child psychology, and Cronbach's alpha in the present sample was .91.

Child Behavior Checklist (parent form). Child behavior problems were assessed with the parent form of the Child Behavior Checklist (CBCL) from the Achenbach System of Empirically Based Assessment [27]. The instrument is designed for children and adolescents aged 6–18 years and assesses emotional and behavioral problems on the basis of parent report. The CBCL has been translated and culturally adapted for use in India, including a Kannada version developed through forward and back translation and cognitive debriefing with parents [28]; this version was used in the present study. In the present study, the total problems score of the full 113-item form (items scored 0–2; possible range 0–226) was used as the index of behavior problems, with higher scores indicating more problems; Cronbach's alpha in the present sample was .94.

2.4. Intervention

The experimental group received mindful parenting training in eight weekly 90-minute group sessions. The structure and content of the sessions followed the eight-session mindful parenting protocol of Bögels and Restifo

[6], summarized in Table 1. Each session included formal meditation practice (e.g., body scan, mindful breathing and sitting meditation), group inquiry into participants' experience of the practice, instruction in parenting-related concepts, and assignment of home practice. Mothers were asked to carry out formal and informal mindfulness practice daily at home and in everyday interactions with their child. The sessions were delivered by the researcher. The control group received no intervention during the study period.

Table 1. Summary of the Mindful Parenting Training Sessions (Adapted from Bögels and Restifo)

Session	Theme	Main content and home practice
1	Automatic parenting	Introduction to the program and group rules; raisin exercise; body scan; the notion of “automatic pilot” in parenting. Home practice: daily body scan and one routine activity with the child done with full attention.
2	Beginner’s mind parenting	Seeing the child “as if for the first time”; noticing judgments and labels about the child. Home practice: mindful observation of the child for five minutes a day.
3	Reconnecting with the body as a parent	Awareness of bodily signals of stress in parenting situations; breathing meditation. Home practice: diary of pleasant parenting moments and accompanying bodily sensations.
4	Responding versus reacting	Three-minute breathing space; identifying triggers of automatic reactions to the child’s behavior. Home practice: diary of unpleasant parenting moments and use of the breathing space before responding.
5	Parenting patterns and schemas	Awareness of parenting patterns from the family of origin and their effect on current reactions. Home practice: noticing recurring patterns in interactions with the child.
6	Conflict and parenting	Mindful handling of conflict with the child; full listening and acceptance of the child’s emotions; repair after conflict. Home practice: mindful listening during a conflict situation.
7	Love and limits	Combining warmth and acceptance with calm, firm limit-setting; compassion meditation for self and child. Home practice: mindful limit-setting and loving-kindness meditation.
8	A mindful path through parenting	Review of experiences and gains; planning for continued practice after the program; closing and posttest.

2.5. Data Analysis

Means, standard deviations and variances of interaction quality and behavior problem scores were calculated for each group at each assessment. For each participant, change scores (posttest minus pretest and follow-up minus pretest) were computed; positive values indicate increases and negative values decreases. Group equivalence on demographic variables and pretest scores was examined with independent *t* tests.

To test Hypotheses 1 and 2, the change scores of the two groups were compared with independent *t* tests. Welch’s *t* test, which does not assume equal variances, was used because it is robust to differences in dispersion between groups. As a supplementary analysis, ANCOVA was conducted with posttest (or follow-up) scores as the dependent variable, group as the factor and pretest scores as the covariate; the assumption of homogeneity of regression slopes was tested via the group $\times$ pretest interaction. To test Hypothesis 3 and to examine within-group change, paired *t* tests were used. Effect sizes for between-group comparisons were reported as Hedges’ *g* (with 95% confidence intervals) and partial η^2 , and for within-group comparisons as *dz*. Given four primary between-group comparisons (two outcomes $\times$ two time points), a Bonferroni-adjusted significance level of .0125 was used.

3. RESULTS

3.1. Demographic Characteristics

The mean age of mothers was 38.4 years (*SD* = 4.2) in the experimental group and 37.9 years (*SD* = 3.8) in the control group, a nonsignificant difference, $t(28) = 0.34$, $p = .73$. The mean age of children was 9.2 years (*SD* = 1.1)

in the experimental group and 8.8 years ($SD = 0.9$) in the control group, also a nonsignificant difference, $t(28) = 1.09$, $p = .29$. Most mothers in both groups held a high-school diploma or an associate degree.

3.2. Descriptive Statistics

Table 2 presents the means, standard deviations and variances of mother–child interaction quality and child behavior problem scores for both groups at the three assessments.

Table 2. Means, Standard Deviations and Variances of the Dependent Variables by Group and Assessment

Variable	Assessment	Experimental group (n = 15)			Control group (n = 15)		
		M	SD	Variance	M	SD	Variance
Mother–child interaction quality	Pretest	54.40	12.77	162.97	52.47	14.76	217.84
	Posttest	63.80	12.49	155.89	51.87	15.51	240.55
	Follow-up	63.20	13.52	182.89	52.47	14.83	219.98
Child behavior problems	Pretest	73.53	25.96	673.84	71.27	23.39	547.21
	Posttest	58.53	27.07	732.55	68.60	23.98	575.11
	Follow-up	61.87	25.95	673.55	69.40	24.00	575.83

Note. Reported score ranges are 0–100 for interaction quality and 0–226 for behavior problems. Higher scores indicate better interaction quality and more behavior problems, respectively.

At pretest, mean mother–child interaction quality did not differ significantly between the experimental (54.40) and control (52.47) groups, $t(27.43) = 0.38$, $p = .70$, and the standard deviations (12.77 and 14.76) indicated similar dispersion; the groups were therefore equivalent on this variable at baseline. At posttest, the experimental group's mean increased to 63.80, whereas the control group's mean (51.87) remained virtually unchanged. At follow-up, the experimental group's mean (63.20) was slightly lower than at posttest but still above pretest, and the control group's mean (52.47) remained at the pretest level.

For behavior problems, pretest means did not differ significantly between the experimental (73.53) and control (71.27) groups, $t(27.70) = 0.25$, $p = .80$, and the standard deviations (25.96 and 23.39) indicated similar dispersion. At posttest, the experimental group's mean decreased to 58.53, while the control group (68.60) showed little change. At follow-up, the experimental group's mean (61.87) was slightly higher than at posttest but still below pretest, and the control group (69.40) remained close to the pretest level.

3.3. Within-Group Change

Table 3 presents the means, standard deviations and variances of change scores from pretest to posttest and from pretest to follow-up.

Table 3. Means, Standard Deviations and Variances of Within-Group Change Scores

Variable	Group	Pretest to posttest			Pretest to follow-up		
		M change	SD change	Variance	M change	SD change	Variance
Mother–child interaction quality	Experimental	+9.40	5.38	28.97	+8.80	5.71	32.60
	Control	−0.60	4.47	19.97	+0.00	3.16	10.00
Child behavior problems	Experimental	−15.00	5.94	35.29	−11.67	5.02	25.24
	Control	−2.67	6.41	41.10	−1.87	4.88	23.84

Note. Change score = posttest or follow-up score minus pretest score. Positive values indicate increases and negative values decreases.

In the experimental group, the mean change in interaction quality was +9.40 from pretest to posttest and +8.80 from pretest to follow-up; in other words, about 94% of the posttest gain was maintained at follow-up. The standard deviations of change (5.38 and 5.71) indicate that the amount of improvement varied among mothers in this group. In the control group, mean changes were negligible (−0.60 and 0.00).

For behavior problems, the experimental group showed a mean decrease of 15.00 points from pretest to posttest and 11.67 points from pretest to follow-up; that is, about 78% of the posttest reduction was maintained at follow-up. The standard deviations of change in this group (5.94 and 5.02) reflect individual differences in the extent of improvement. In the control group, changes were small (−2.67 and −1.87).

The standard deviations of change scores were of similar magnitude in the two groups, so the larger mean changes in the experimental group did not arise from unusually small variability in the control group. None of the within-group changes in the control group was statistically significant (Table 5).

Overall, the descriptive pattern is consistent with the study hypotheses: in the experimental group, mother–child interaction quality increased and mother-reported child behavior problems decreased, with most of these changes maintained at the two-month follow-up, whereas the control group showed no appreciable change across the three assessments. The results of hypothesis testing are presented below.

3.4. Hypothesis Testing

The results of the between-group comparisons of change scores and the ANCOVAs are presented in Table 4.

Table 4. Hypothesis Testing: Between-Group Comparisons of Change Scores and ANCOVA

Outcome and time point	Welch <i>t</i> test on change scores	Hedges' <i>g</i> [95% CI]	ANCOVA controlling for pretest	Adjusted means (Exp. / Control)
Interaction quality, posttest	$t(27.08) = 5.54, p < .001$	1.97 [1.10, 2.84]	$F(1, 27) = 30.35, p < .001, \eta^2 = .53$	62.88 / 52.79
Interaction quality, follow-up	$t(21.85) = 5.22, p < .001$	1.86 [1.00, 2.71]	$F(1, 27) = 26.64, p < .001, \eta^2 = .50$	62.26 / 53.41
Behavior problems, posttest	$t(27.84) = -5.47, p < .001$	-1.94 [-2.81, -1.07]	$F(1, 27) = 28.79, p < .001, \eta^2 = .52$	57.40 / 69.74
Behavior problems, follow-up	$t(27.98) = -5.42, p < .001$	-1.92 [-2.79, -1.06]	$F(1, 27) = 28.18, p < .001, \eta^2 = .51$	60.74 / 70.52

Note. Welch-adjusted degrees of freedom are reported because of unequal variances. Hedges' *g* is based on the pooled standard deviation of change scores. All comparisons remained significant after Bonferroni correction ($\alpha = .0125$).

Hypothesis 1. The increase in mother–child interaction quality from pretest to posttest was significantly greater in the experimental group (+9.40) than in the control group (−0.60), $t(27.08) = 5.54, p < .001, g = 1.97$. ANCOVA controlling for pretest scores also showed a significant group effect, $F(1, 27) = 30.35, p < .001, \eta^2 = .53$, and the assumption of homogeneity of regression slopes was met, $F(1, 26) = 0.71, p = .41$. Hypothesis 1 was therefore supported.

Hypothesis 2. The decrease in behavior problems from pretest to posttest was significantly greater in the experimental group (−15.00) than in the control group (−2.67), $t(27.84) = -5.47, p < .001, g = -1.94$. ANCOVA confirmed this result, $F(1, 27) = 28.79, p < .001, \eta^2 = .52$, and the assumption of homogeneity of slopes was met, $F(1, 26) = 0.09, p = .77$. Hypothesis 2 was therefore supported.

Hypothesis 3. At follow-up, the difference between groups in change was also significant for interaction quality, $t(21.85) = 5.22, p < .001, g = 1.86$, and behavior problems, $t(27.98) = -5.42, p < .001, g = -1.92$. Paired *t* tests (Table 5) showed that in the experimental group, follow-up scores on both variables still differed significantly from pretest (interaction quality: $t(14) = 5.97, p < .001, dz = 1.54$; behavior problems: $t(14) = -8.99, p < .001, dz = -2.32$), whereas none of the changes in the control group was significant. Hypothesis 3 was therefore also supported.

Table 5. Paired *t* Tests for Within-Group Change

Outcome	Group	Pretest to posttest	Pretest to follow-up
Interaction quality	Experimental	$t(14) = 6.76, p < .001, dz = 1.75$	$t(14) = 5.97, p < .001, dz = 1.54$
Interaction quality	Control	$t(14) = -0.52, p = .61, dz = -0.13$	$t(14) = 0.00, p = 1.00, dz = 0.00$
Behavior problems	Experimental	$t(14) = -9.78, p < .001, dz = -2.53$	$t(14) = -8.99, p < .001, dz = -2.32$
Behavior problems	Control	$t(14) = -1.61, p = .13, dz = -0.42$	$t(14) = -1.48, p = .16, dz = -0.38$

4. DISCUSSION

This study examined the effectiveness of mindfulness-based parenting training on mother–child interaction quality and behavior problems in boys with mild intellectual disability. Compared with the control group, mother–child interaction quality increased significantly and child behavior problems decreased significantly in the experimental group, and these changes were largely maintained two months after the intervention; all three hypotheses were thus supported. The following sections interpret these findings in light of the theoretical framework and previous research.

4.1. Mother–Child Interaction Quality

The increase in interaction quality in the experimental group is consistent with Coatsworth et al. [18], who showed that integrating mindfulness components into family-based programs is associated with better parent–child relationship quality. It is also consistent with Singh et al. [17], who reported changes in mothers’ interaction style after mindful parenting training. One possible explanation is the mechanism of reperiencing [9]: a mother who learns to observe her thoughts and emotions in the moment may, in difficult situations, choose a more considered response instead of automatic responses such as shouting or giving in. From the perspective of Duncan et al.’s [7] model, components such as listening with full attention and nonjudgmental acceptance of the child overlap directly with dimensions of interaction such as sensitivity, warmth and responsiveness; it is therefore not surprising that the largest change was observed at the level of the relationship.

Because the two groups did not differ in pretest interaction quality, the larger gains in the experimental group cannot be attributed to baseline differences, and regression to the mean is also an unlikely explanation, as both groups started from similar levels. Nevertheless, because mothers volunteered for the study and the sessions were delivered by the researcher, differences in motivation or expectations cannot be fully excluded.

4.2. Child Behavior Problems

The reduction in mother-reported child behavior problems is consistent with Neece [19], who showed in a randomized design that children of parents who took part in MBSR displayed fewer behavior problems. It also agrees with Singh et al.’s [17] report of reduced aggression in children with developmental disabilities after mindful parenting training. In the Indian context, Gupta and Kaur [25] documented elevated stress among parents, particularly mothers, of children with intellectual disability; given the bidirectional relationship between parental stress and child behavior, the present finding suggests that a parent-focused group program may address this burden with benefits that extend to the child level.

Theoretically, this finding can be explained by the coercive family process model [14, 15]. If a mother can respond to a challenging behavior with calm and acceptance rather than with a negative, escalating response, the chain of mutual reinforcement of negative behaviors is broken and the behavior becomes less likely to recur. Moreover, given the bidirectional relationship between child behavior and parental distress [3, 4], reduced maternal reactivity may indirectly affect the emotional climate of the home and, in turn, the child’s behavior. The correlational findings of Jones et al. [21], which identified mindfulness and acceptance as mediators of the relationship between child behavior and parental distress, also support this explanation.

Two considerations are, however, essential in interpreting this finding. First, behavior problems were measured solely through the reports of mothers who participated in the intervention and were aware of its aims. Part of the reported reduction may therefore reflect a change in the mother's perception of her child's behavior (e.g., greater acceptance or less judgment) rather than an actual change in the child's behavior. Although a change in maternal perception is itself a valuable clinical outcome, distinguishing between these two explanations requires independent informants, such as teachers, or systematic observation. Second, the between-group effect on behavior problems ($g = 1.94$) is considerably larger than the small effects of parental mindfulness interventions on child psychological outcomes reported in meta-analyses ($g = 0.27$) [23]. This discrepancy may reflect the small sample, which tends to inflate effect size estimates, the use of a no-intervention control group and maternal reporting bias, and it underscores the need for replication in larger trials.

4.3. Maintenance of Effects and Individual Differences in Response

The follow-up pattern showed that most of the changes observed at posttest were maintained two months after the intervention (about 94% for interaction quality and 78% for behavior problems), although gains declined slightly. This finding is consistent with Burgdorf et al. [23], who reported that the effects of mindfulness interventions on parenting stress were maintained, and even larger, at two-month follow-up ($g = 0.53$). One possible explanation for the durability of effects is that mindfulness, unlike some behavioral techniques, is a general skill that the mother can apply across many situations in daily life. The slight decline in gains at follow-up, however, suggests that maintenance probably depends on continued practice and that booster sessions may be beneficial.

The relatively large standard deviations of change scores in the experimental group indicate that not all mothers benefited equally from the intervention. This variability may stem from differences in baseline mindfulness, adherence to home practice, social support, the severity of the child's disability or maternal personality characteristics. Because these variables were not measured in the present study, these explanations remain hypotheses for future research.

4.4. Theoretical Contribution

The findings contribute to the theoretical literature in several ways. First, by examining relationship-level and child-level outcomes together, they provide preliminary evidence for the "upstream" model of mindfulness, according to which an intervention focused on the parent's psychological state can be accompanied by change at the child level without targeting the child's behavior directly [6, 7]. Second, they extend evidence on mindful parenting from autism and ADHD populations to children with mild intellectual disability in the Indian cultural context. Third, the consistency of the findings with the coercive family process model [14, 15] suggests that mindfulness can be conceptualized within this model as an intervention mechanism that disrupts the cycle of negative action and reaction from the parent's side. Because the mediating variables (maternal mindfulness, parenting stress and emotion regulation) were not measured, however, these theoretical pathways were not empirically tested in the present study.

4.5. Practical Implications

If the findings are confirmed in studies with stronger designs, several practical implications follow. First, mindfulness-based parenting training could be used as a group-based, relatively low-cost intervention for mothers of children with intellectual disability in rehabilitation centers, special-education schools and psychology clinics; its eight-session group format fits the existing structure of special-education schools. Second, given the slight decline in gains at follow-up, periodic booster sessions and encouraging regular home practice may help maintain effects; the optimal interval between such sessions requires investigation. Third, given individual differences in response, identifying mothers who need additional support and offering them supplementary individual sessions or smaller groups is recommended. Fourth, familiarizing teachers and staff of special-education schools with mindfulness principles and integrating them into daily interactions with students may extend the effects of the intervention from home to school. Finally, including such programs in the inclusive-education services of Samagra Shiksha and the public health system could increase families' access to these interventions.

4.6. Limitations

The findings should be interpreted in light of several limitations. First, the small sample (15 per group) limits statistical power and makes effect size estimates unstable; the width of the confidence intervals in Table 4 reflects this instability. Second, convenience sampling and the restriction of the sample to mothers of boys with mild intellectual disability in Bengaluru limit generalization to girls, children with severe and profound disability, fathers and other regions. Third, although the groups were equivalent at pretest, allocation by lottery among volunteers in a small sample cannot guarantee equivalence on unmeasured characteristics such as motivation. Fourth, both outcomes were measured through the reports of mothers who participated in the intervention and were aware of its aims; expectancy bias, social desirability and shared method variance cannot therefore be ruled out. Fifth, the interaction quality measure was researcher-developed, and evidence for its construct validity is limited. Sixth, the control group received no intervention; nonspecific effects such as group support, professional attention and expectations of improvement cannot therefore be separated from the specific effect of the mindfulness components. Seventh, maternal mindfulness, parenting stress and adherence to practice were not measured; it therefore cannot be confirmed that the changes occurred through increased mindfulness. Eighth, the two-month follow-up is too short to assess long-term maintenance. Ninth, because the covariance between posttest and follow-up scores was not available, a three-wave mixed ANOVA was not conducted, and comparisons were reported as two-wave contrasts (pretest versus each later assessment).

4.7. Directions for Future Research

In light of these limitations, the following directions are suggested for future research. First, prospectively registered randomized trials with power analysis, blinded assessors and larger samples that include mothers of girls and children with different levels of intellectual disability. Second, the use of an active control group (e.g., behavioral parent training or a support group) to separate the specific effect of mindfulness from nonspecific effects. Third, multi-informant and multi-method assessment of outcomes, including observational coding of mother–child interaction and teacher reports of child behavior. Fourth, measurement of mediating variables such as mindful parenting, parenting stress and maternal emotion regulation and testing of mediation models, as well as examination of moderators such as social support, the severity of the child’s disability and maternal personality characteristics. Fifth, studies with longer follow-up (six months to one year or more). Sixth, comparison of the effectiveness of mindfulness with other interventions such as parenting skills training, attribution retraining and cognitive-behavioral therapy, and examination of their combined effects. Seventh, examination of broader outcomes such as parenting self-efficacy, family quality of life, maternal mental health and children’s academic and social functioning. Finally, cross-cultural studies to examine the role of cultural context in the effectiveness of this intervention.

5. CONCLUSION

This preliminary quasi-experimental study showed that, after eight sessions of mindfulness-based parenting training, mother–child interaction quality increased significantly and mother-reported behavior problems of boys with mild intellectual disability decreased significantly in the experimental group, and that these changes were largely maintained two months after the intervention, whereas the control group showed no appreciable change. This pattern is consistent with theoretical frameworks that view mindfulness as a mechanism for reducing parental reactivity and disrupting negative interaction cycles. However, the small sample, reliance on maternal report and effect sizes larger than those usually reported in the literature make firm conclusions about the magnitude of effectiveness difficult. Mindfulness-based parenting training can therefore be regarded as a promising intervention for families of children with intellectual disability that should be evaluated in more rigorous randomized trials before being widely recommended at the policy level.

Author contribution

The author was responsible for the conception and design of the study, delivery of the intervention, data collection and analysis, and preparation of the manuscript, and read and approved the final manuscript.

Use of generative AI

During the preparation of this work, the author used generative AI tools to assist with translation into English and to improve the language and readability of the manuscript. After using these tools, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

Acknowledgments

The author thanks the mothers who participated in the study and the staff of the participating special-education schools for their cooperation.

Competing interests

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Considerations

The aims and procedures of the study were explained to the mothers, and written informed consent was obtained before participation. Participation was voluntary, mothers could withdraw at any time without any effect on their child's educational services, and all information was kept confidential and reported only in aggregate form. After the follow-up assessment, mothers in the control group were offered the same training program.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical and confidentiality considerations.

REFERENCES

- [1] Baker, B. L., McIntyre, L. L., Blacher, J., Crnic, K., Edelbrock, C., & Low, C. (2003). Pre-school children with and without developmental delay: Behaviour problems and parenting stress over time. *Journal of Intellectual Disability Research*, 47(4–5), 217–230.
- [2] Howe, D. (2006). Disabled children, parent–child interaction and attachment. *Child & Family Social Work*, 11(2), 95–106.
- [3] Neece, C., & Baker, B. (2008). Predicting maternal parenting stress in middle childhood: The roles of child intellectual status, behaviour problems and social skills. *Journal of Intellectual Disability Research*, 52(12), 1114–1128. <https://doi.org/10.1111/j.1365-2788.2008.01071.x>
- [4] Hastings, R. P., & Brown, T. (2002). Behavior problems of children with autism, parental self-efficacy, and mental health. *American Journal on Mental Retardation*, 107(3), 222–232.
- [5] Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156. <https://doi.org/10.1093/clipsy.bpg016>
- [6] Bögels, S., & Restifo, K. (2014). *Mindful parenting: A guide for mental health practitioners*. Springer.
- [7] Duncan, L. G., Coatsworth, J. D., & Greenberg, M. T. (2009). A model of mindful parenting: Implications for parent–child relationships and prevention research. *Clinical Child and Family Psychology Review*, 12(3), 255–270. <https://doi.org/10.1007/s10567-009-0046-3>
- [8] Evans, J. St. B. T. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology*, 59, 255–278. <https://doi.org/10.1146/annurev.psych.59.103006.093629>

- [9] Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373–386. <https://doi.org/10.1002/jclp.20237>
- [10] Bowlby, J. (1988). *A secure base: Parent–child attachment and healthy human development*. Basic Books.
- [11] Siegel, D. J. (2007). *The mindful brain: Reflection and attunement in the cultivation of well-being*. W. W. Norton.
- [12] Cassidy, J., & Shaver, P. R. (Eds.). (2016). *Handbook of attachment: Theory, research, and clinical applications* (3rd ed.). Guilford Press.
- [13] Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 793–828). Wiley.
- [14] Patterson, G. R. (1982). *Coercive family process*. Castalia.
- [15] Granic, I., & Patterson, G. R. (2006). Toward a comprehensive model of antisocial development: A dynamic systems approach. *Psychological Review*, 113(1), 101–131. <https://doi.org/10.1037/0033-295X.113.1.101>
- [16] Abidin, R. R. (1992). The determinants of parenting behavior. *Journal of Clinical Child Psychology*, 21(4), 407–412. https://doi.org/10.1207/s15374424jccp2104_12
- [17] Singh, N. N., Lancioni, G. E., Winton, A. S. W., Singh, J., Curtis, W. J., Wahler, R. G., & McAleavey, K. M. (2007). Mindful parenting decreases aggression and increases social behavior in children with developmental disabilities. *Behavior Modification*, 31(6), 749–771. <https://doi.org/10.1177/0145445507300924>
- [18] Coatsworth, J. D., Duncan, L. G., Greenberg, M. T., & Nix, R. L. (2010). Changing parents’ mindfulness, child management skills and relationship quality with their youth: Results from a randomized pilot intervention trial. *Journal of Child and Family Studies*, 19(2), 203–217. <https://doi.org/10.1007/s10826-009-9304-8>
- [19] Neece, C. L. (2014). Mindfulness-based stress reduction for parents of young children with developmental delays: Implications for parental mental health and child behavior problems. *Journal of Applied Research in Intellectual Disabilities*, 27(2), 174–186. <https://doi.org/10.1111/jar.12064>
- [20] Minor, H. G., Carlson, L. E., Mackenzie, M. J., Zernicke, K., & Jones, L. (2006). Evaluation of a mindfulness-based stress reduction (MBSR) program for caregivers of children with chronic conditions. *Social Work in Health Care*, 43(1), 91–109. https://doi.org/10.1300/J010v43n01_06
- [21] Jones, L., Hastings, R. P., Totsika, V., Keane, L., & Rhule, N. (2014). Child behavior problems and parental well-being in families of children with autism: The mediating role of mindfulness and acceptance. *American Journal on Intellectual and Developmental Disabilities*, 119(2), 171–185. <https://doi.org/10.1352/1944-7558-119.2.171>
- [22] Beer, M., Ward, L., & Moar, K. (2013). The relationship between mindful parenting and distress in parents of children with an autism spectrum disorder. *Mindfulness*, 4(2), 102–112. <https://doi.org/10.1007/s12671-012-0192-4>
- [23] Burgdorf, V., Szabó, M., & Abbott, M. J. (2019). The effect of mindfulness interventions for parents on parenting stress and youth psychological outcomes: A systematic review and meta-analysis. *Frontiers in Psychology*, 10, Article 1336. <https://doi.org/10.3389/fpsyg.2019.01336>
- [24] Haydicky, J., Wiener, J., Badali, P., Milligan, K., & Ducharme, J. M. (2012). Evaluation of a mindfulness-based intervention for adolescents with learning disabilities and co-occurring ADHD and anxiety. *Mindfulness*,

3(2), 151–164. <https://doi.org/10.1007/s12671-012-0089-2>

- [25] Gupta, R. K., & Kaur, H. (2010). Stress among parents of children with intellectual disability. *Asia Pacific Disability Rehabilitation Journal*, 21(2). https://www.dinf.ne.jp/doc/english/asia/resource/apdrj/vol21_2_2010/10stressinteldisability.html
- [26] Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Pearson.
- [27] Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms & profiles*. University of Vermont, Research Center for Children, Youth, & Families.
- [28] Wild, D., Furtado, T., & Angalakuditi, M. (2012). The translation and cultural adaptation of the Child Behavior Checklist for use in Israel (Hebrew), Korea, the US (Spanish), India (Malayalam and Kannada), and Spain. *Psychology Research and Behavior Management*, 5, 51–56. <https://doi.org/10.2147/PRBM.S28009>
- [29] World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, 310(20), 2191–2194. <https://doi.org/10.1001/jama.2013.281053>