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ORIGINAL PAPER

Mindful Parenting: A Randomized Controlled Trial on a Protocol Adapted for Chinese Parents with Elevated Parenting Stress in Hong Kong

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Abstract

Objectives Parenting stress has tremendous impacts on the wellbeing of not only parents but also children and the entire family. To help stressful parents respond more effectively, this study evaluated the acceptability and efficacy of a localized mindful parenting (MP) program in Hong Kong.

Methods In this randomized controlled trial, 163 parents (M_{age} = 42 years old; 88% female) with children aged 4–17 years and elevated parenting stress were publicly recruited and randomized to receiving the MP program ($n_{treatment}$ = 83) or simply waiting 16 weeks for the treatment ($n_{waitlist\text{-}control}$ = 80). Attrition and attendance were tracked. Linear mixed modeling (LMM) was used to examine the program efficacy.

Results Attrition from the MP program was 12%. Fifty-eight (70%) parents in the treatment condition completed at least six of the eight sessions. The MP program effected resulted in both immediate and longer-term changes of moderate-to-large sizes in parenting stress, general mindfulness, and mindful parenting. Accounting for natural changes, both the immediate and longer-term effects of the MP program were of small-to-moderate sizes in improving general mindfulness and mindful parenting. Although similar effect sizes were observed for reducing parenting stress beyond natural changes, only the longer-term effect reached statistical significance after adjusting for repeated testing.

Conclusions Despite COVID-19-related disruptions, the localized MP program demonstrated acceptability and efficacy among Chinese parents in Hong Kong. Expanding the sample size, diversity within a sample, and measurement methodologies, future research may explore the program's differential effects by clinical or demographic groups, parenting constructs, and delivery modes.

Preregistration This study was approved on 2019–05-03 on the Chinese Clinical Trial Registry (ChiCTR1900022923).

Keywords Mindfulness · Parenting stress · Child development · Child-rearing · Psychotherapy

Parenting stress is an inevitable part of parenthood and can be overwhelming. Ineffective management of parenting

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stress can be detrimental to not only the parent but also the child(ren) and the whole family. To help parents defuse from stress response and create space to better attend to demands in the context of parenting, mindfulness-based interventions have been designed to help parents bring intentional and nonjudgmental awareness to the present moment parenting experience. In response to the heightened stress under the metropolitan living circumstances and the cultural emphasis on avoiding shame among Chinese parents living in Hong Kong, this randomized controlled trial examines how mindful parenting can help equip these local parents with positive coping strategies to respond effectively to the demands and stress in the context of parenting.

Parents experience distress from balancing their time and energy across various parenting tasks, caring for other family members, managing household expenses, and other family as well as personal responsibilities. Moreover, sources of parenting stress can be universal or culturally specific. The fast pace of living, dense population, and competitive academic environment, combined with a culture that highlights familial obligations and avoidance of collective shame or criticism, particularly add to parenting stress among Chinese parents in Hong Kong (Bond, 1993; Chan & Mo, 2023; Chyu & Chen, 2022; Kwok & Wong, 2000; Lam, 1999). Most concerningly, parents who are stressed tend to exhibit poorer attunement with their children (Azhari et al., 2019), more use of negative parenting (Liu & Wang, 2015), less engagement in positive parenting and greater parent–child conflicts (Liu et al., 2020), and more family discords (Jones et al., 2021). These are likely manifestations of stress response; stress prompts fight-or-flight reactions in parents, limiting their capacity to attend to their children's needs or actual demands in the immediate environment and prompting emotion-driven behaviors that can be detrimental to parents, children, and the whole family (Bögels et al., 2020).

Mindfulness-based interventions have increasingly been applied to the parenting context to address parental well-being and parent–child relationships (Ahemaitijiang et al., 2021a). Leveraging one of the keys in mindfulness, the intention of bringing awareness to the parenting experience is to enhance parents' (1) understanding of their own emotions, needs, and limits as well as those of their children, and (2) recognition of their own reactive impulses to respond wisely to each parenting situation. Depending on the parents' emotions and the circumstances, reactive impulses may prompt parents to yell or hit (e.g., out of anger), overprotect (e.g., out of fear), or overcontrol (e.g., out of worry) their children. Consistent practice of mindfulness allows disengagement from the fight-or-flight mode or emotion-driven behaviors when parents are under stress, thereby bolstering the capacity to notice their own limits and needs as well as those of their children and the compassion toward themselves as well as others (Bögels & Restifo, 2014).

Regardless of the sample (i.e., clinical or communal, Western or non-Western, etc.), the literature generally suggests that mindfulness-based interventions for parents have a small-to-moderate effect on parenting stress and children's psychological functioning (Anand et al., 2023; Burgdorf et al., 2019). Targeting primarily parenting stress, Bögels and Restifo's (2014) Mindful Parenting (MP) program has been shown to also improve parenting behaviors, parental psychopathology, and co-parenting (Bögels et al., 2014). Although the MP program does not have a child component, parents report also improvements in various child outcomes following the intervention (Bögels et al., 2014; Potharst et al., 2021). Research on the MP program has gradually emerged in the Chinese context in recent years. Qualitative reports of parents demonstrate enhanced emotion regulation, increased compassion, and improved parent–child relationships after participation in the MP program (Ma & Siu, 2016). Preliminary results on implementing the MP program in the local community support its benefits to Hong Kong parents on their parenting stress, mindfulness, parenting practice, psychopathology, and the behavioral adjustment of their children (Powell et al., 2024). Initial evidence also suggests that the MP program can improve general mindfulness and self-compassion among Chinese parents of children with attention-deficit/hyperactivity disorder (Liu et al., 2021) and parenting stress as well as emotional awareness among Chinese parents with adverse childhood experiences (Lyu & Lu, 2023).

With promising results on Chinese parents' general receptiveness toward the MP program and efficacy among those with specific clinical needs, additional and rigorously designed studies such as randomized controlled trials are called for to support its application to addressing the heightened demands from the broader context of parenting in Hong Kong. To test the effect of the MP program in addressing parenting stress broadly for parents of children at different developmental stages, this study recruited parents of children aged 4 to 17 years. The MP program is for parents with children of all ages (Bögels & Restifo, 2014) and has been successfully applied in mixed groups of parents with children in different developmental stages, under both clinical contexts (e.g., Bögels et al., 2014) and non-clinical or preventative contexts (e.g., Potharst et al., 2021). The current randomized controlled trial (RCT) aimed to examine (1) the acceptability of a localized MP program in Hong Kong, and (2) its efficacy against a waitlist-control condition among local Chinese parents. It was hypothesized that the localized MP program would demonstrate a retention rate and benefits comparable to those reported in Western samples. Parents were expected to show a decrease in parenting stress and an increase in mindfulness and mindful parenting after participating in the MP program, relative to their waitlist-control counterparts.

Method

Participants

Public recruitment was conducted via advertisement on social media, press release to local media, and promotion to local schools and community centers in Hong Kong. Leaflets with infographics were prepared to provide information on the current study, potential benefits of the MP program, and instructions on study enrolment. Interested individuals scanned a QR code on the leaflet to complete a screening questionnaire, with dichotomous items designed to assess eligibility specifically for the current study and the Parental Stress Scale (see the "Measures" section). Follow-up interviews were conducted by trained research assistants under the supervision of a qualified clinical psychologist to ensure the accuracy of the screening results before providing logistical details to eligible parents. Data collection and management were centralized using Research Electronic Data Capture (REDCap; Harris et al., 2009, 2019), a secure web-based platform designed to support research endeavors. REDCap offered a unique log-in account and data access authorization for each project staff. It also provided detailed tracking of actions for each personnel after logging into the system. All these measures provided a high level of security to ensure only authorized personnel could access the study data and only to the extent that was necessary to complete an action.

Inclusion and Exclusion Criteria

Because the MP program has been successfully applied in mixed groups of parents with children in different developmental stages and the role of parents could be very different between parenting a minor and an adult child, recruitment focused on Chinese parents with children aged 4–17 years. Moreover, only those who scored ≥ 46 on the Parental Stress Scale were screened for eligibility. This was to ensure the relevance of findings to parents experiencing heightened stress in Hong Kong (i.e., target group of the current study). Because the MP program was designed for parents to manage their experience of stress rather than crises, those presented at the screening interview with high risks for self-harm, suicide, or homicide, substance abuse or dependence, psychosis, and concurrent mindfulness or parenting classes were deemed ineligible and excluded from the study.

Sample Size Planning

Considering the early stage of investigation on the MP program among Chinese parents, the anticipatory effect size to be used in the current sample size planning was determined based on the experience of the research team in conducting mindfulness-based intervention studies on Chinese samples and meta-analysis results on studies conducted on the MP program in the Western literature (e.g., Burgdorf et al., 2019). Using an online power calculator created for a superiority trial ("Power calculator," 2012), a sample size of 126 (i.e., 63 parents in each group) would provide a statistical power of 0.80 in detecting a moderate effect size of 0.50 at a critical level of 0.05. With the average attrition rate of approximately 20% across parenting programs in mind (Chacko et al., 2016), a final sample size of 160 (i.e., 80 parents in each group) was targeted.

Final Sample

Condition allocation was computerized and unblinded. The final sample consisted of 163 parents, who were assigned via simple randomization to either the treatment condition ($n = 83$) or the waitlist-control condition ($n = 80$; see Fig. 1). A list of allocations in randomized sequence was created and entered into REDCap prior to participant recruitment. The system revealed the allocation for a participant only after the individual was deemed eligible for the study. Therefore, although operational staff were informed of the allocation outcome, they were blinded from the allocation sequence to minimize bias in the process of condition assignment. Statistical tests were conducted to check comparability between the two conditions after data collection was completed. Demographics were equivalent across the two conditions, except for the age of the target child (i.e., a specific child on whom parents completed parenting and child measures at all time points; see Table 1).

Procedure

All parents completed informed consent and *baseline* (i.e., T0) measures at their orientation session. Parents in the treatment condition then received an 8-week MP program and completed *post-intervention* (i.e., T1) measures at the end of the eighth session. They were also invited to a booster session 2 months afterwards, where they reviewed their learning and completed the *2-month follow-up* (i.e., T2) measures. To reduce potential biases in parents' responses to the T1 and T2 measures, the booster session was offered to parents regardless of their treatment attendance and completion of measures. Parallel to this schedule, parents in the waitlist-control condition completed T1 and T2 measures at eight and 16 weeks after baseline, respectively. These parents were offered the MP program after their completion of the T2 measures.

The current RCT was conducted in Hong Kong between 3 September 2019 and 31 August 2023, coinciding with

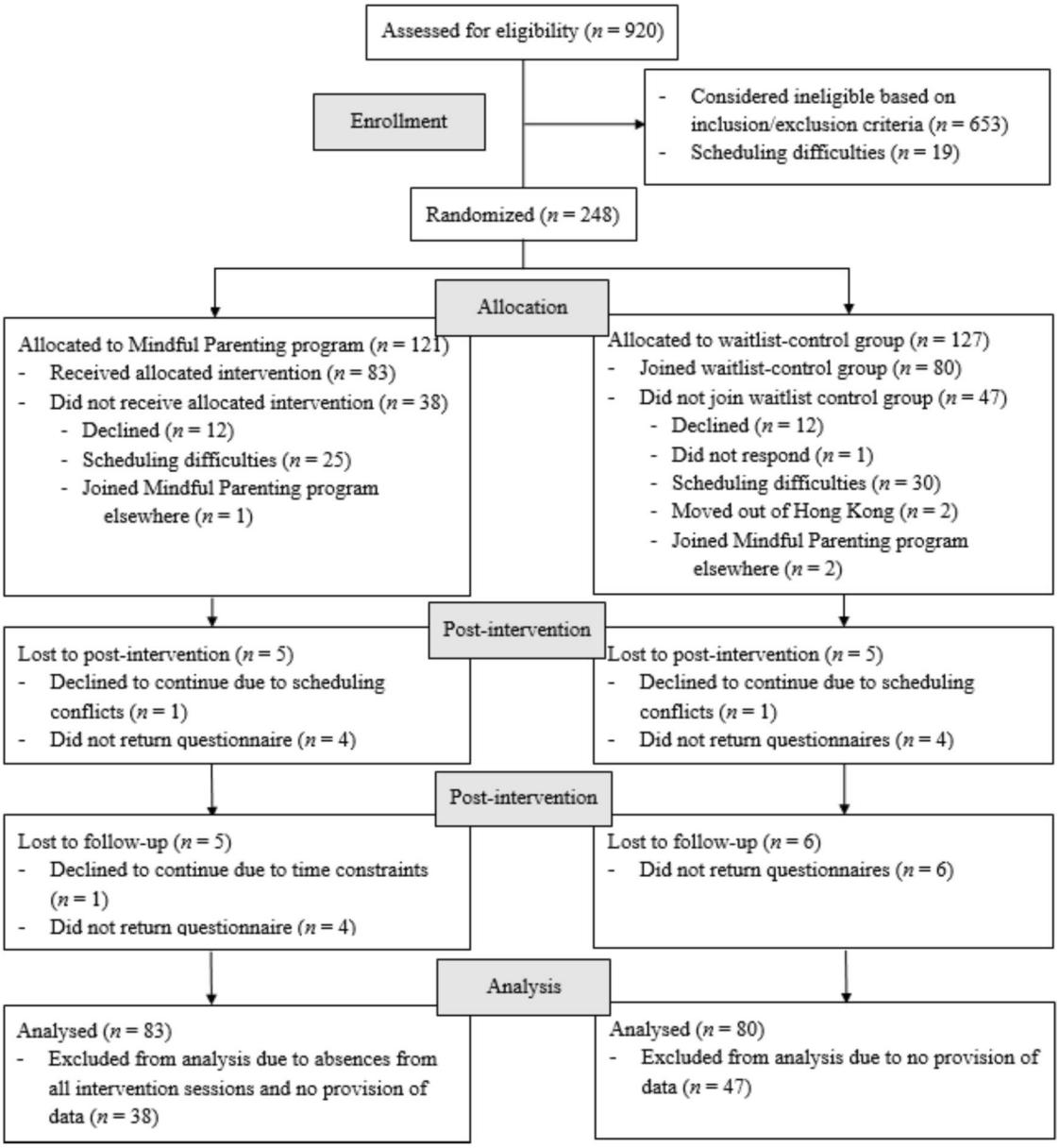

Fig. 1 The consolidated standards of reporting trials flow diagram

the span of the COVID-19 pandemic. A total of 11 MP groups of 4–10 parents were conducted. There were multiple rescheduling of the MP groups and changes to parents' schedules following changes in their children's class arrangement under the pandemic. Following public health guidelines on social distancing, some supposedly in-person sessions were converted online to minimize learning disruptions for ongoing groups and to address the long wait for treatment among parents enrolled earlier on. Moreover, adhering to the health restrictions on food intake in public spaces while maintaining the integrity and objectives of the mindful eating exercise, the food component was omitted and parents were instead encouraged to practice mindful eating at home. Among the 83 parents assigned to the treatment condition, 53 attended the MP program in-person, 11 received both in-person and online sessions, and 19 attended the MP program completely online.

Intervention

The current MP program adopted Bögels and Restifo's (2014) protocol. Following an orientation session, the eight MP sessions focused on (1) automatic parenting, (2) beginner's mind in parenting, (3) reconnecting with our body as a parent, (4) responding versus reacting to parenting stress, (5) parenting patterns and schemas, (6) conflict and

Table 1 Demographic information of participants

	Treatment ($n=83$)	Waitlist-control ($n=80$)	p-value
Age at enrolment, in years, *M* (*SD*)	41.8 (5.98)	42.8 (5.44)	0.29
Female, *n* (%)	76 (92%)	68 (85%)	0.27
Age of target child at enrolment, in years, *M* (*SD*)	8.5 (3.41)	9.7 (3.81)	0.03
Female target child, *n* (%)	34 (41%)	40 (50%)	0.25
Education, *n* (%)			0.38
Secondary school or below	23 (28%)	15 (19%)	
Diploma or associate's degree	12 (15%)	13 (16%)	
Bachelor's degree or above	47 (57%)	52 (65%)	
Employment status, *n* (%)			0.36
Fulltime employment	37 (45%)	45 (56%)	
Parttime employment	14 (17%)	9 (11%)	
Home carer	29 (35%)	26 (33%)	
Marital status, *n* (%)			0.79
Married	76 (92%)	70 (88%)	
Separated/divorced	3 (4%)	5 (6%)	
Single	2 (2%)	2 (3%)	
Monthly household income, *n* (%)			0.95
HKD20,000 or below	16 (19%)	14 (18%)	
HKD20,001–HKD40,000	28 (34%)	27 (34%)	
HKD40,001 or above	37 (45%)	37 (46%)	
Endorsement of religious belief, *n* (%)	32 (39%)	33 (41%)	0.77

parenting, (7) love and limits—cultivating compassion and setting limits, and (8) review and plan for continued practice. Throughout the MP program, parents were provided with materials and encouraged to practice mindfulness for 30–45 min daily. A follow-up session was also scheduled at 2 months after the 8-week program to facilitate continued practice and learning.

Localization of the protocol was a team effort by several local experts in mindfulness. Based on the feedback from practitioners with extensive experience in working with Chinese parents in Hong Kong, session duration was reduced to accommodate scheduling difficulties frequently reported by parents because of routine family responsibilities and child-rearing demands. The 30-min intermission in the original protocol was eliminated, and the duration of each mindfulness exercise was shortened by 5–10 min. These adjustments allowed each session to be confined to a total of 2 hr and 30 min, as compared to 3 hr in the original protocol. Modification of the session length was necessitated by the scheduling constraints of Chinese parents in Hong Kong, who typically attended the MP sessions during their children's class hours on weekdays or engagement in extracurricular activities on the weekends. Under such circumstances, parents had to rush to the MP sessions after dropping off their children and leave the MP sessions early enough to pick up their children on time. With the principle of minimal content alteration in mind, apart from the temporal adjustments to the MP sessions, the structure of the sessions and that of each mindfulness exercise remained consistent with the original protocol. These adaptations were also discussed with MP developer and teacher trainer, Prof. Susan Bögels.

Facilitators

Two social workers and two clinical psychologists with extensive experience in teaching mindfulness and handling various mental health conditions were recruited for the current study. Prior to study commencement, they were trained on the MP program by developer Prof. Susan Bögels in a five-and-a-half-day, in-person experiential workshop. This training required prior completion of an 8-week mindfulness-based intervention course and a 5-day silent retreat. The training curriculum included comprehensive participation in all exercises of the MP program, facilitation of teach-back sessions on the core exercises, and a half-day retreat on the third day of training. This self-practice and self-reflection method followed the common and recommended pedagogical approach in clinical training (e.g., Collard, 2024; Gale & Schröder, 2014; Thwaites et al., 2014). All facilitators were briefed as a group on the localized protocol and logistic arrangements to ensure consistency and readiness in implementing the program.

Intervention Fidelity

Each facilitator underwent two rounds of supervision to ensure protocol adherence, quality of service, and skillfulness in facilitating the mindfulness exercises. The first round, conducted by Dr. Candice Powell (a clinical psychologist who co-developed the adapted protocol), involved session-by-session reviews. The second round, led by Prof. Susan Bögels, focused on improving facilitation skills and personal reflective practice in conducting MP.

Measures

Acceptability

Attendance and attrition were used to assess the acceptability of the localized MP program. Considering the usual practice at local clinics, parents who attended at least six of the eight sessions (i.e., ≥ 75% attendance) were considered to have completed the program. The proportion of parents who attended less than four sessions (< 50% attendance) was also assessed to reflect limited engagement in the program. Moreover, the number of withdrawals (i.e., parents who explicitly declined to continue with the treatment) and dropouts (i.e., parents who stopped attending their MP program without any notices or follow-ups) was tracked to assess premature termination of treatment.

Parenting Stress

The Parental Stress Scale (PSS) was designed to assess stress and rewards or satisfaction from child-rearing (Berry & Jones, 1995). Parents rated on a 5-point Likert scale, from 1 = *Strongly disagree* to 5 = *Strongly agree*. The Chinese PSS demonstrated high reliability (e.g., $a = 0.99$) and validity (e.g., correlated with Parenting Stress Index at an $r = 0.75$), with a cut-off score at 46 differentiating parents of children with clinical needs from those of typically developing children (Leung & Tsang, 2010). It also demonstrated satisfactory internal consistency in the current study ($\alpha_{T0} = 0.77$, $\alpha_{T1} = 0.85$, $\alpha_{T2} = 0.85$).

Mindfulness

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) was designed to measure an individual's dispositional mindfulness. Parents rated on a 5-point Likert scale from 1 = *Never* to 5 = *Always*. The Chinese FFMQ demonstrated satisfactory psychometrics, with scores on the original 39-item version and those on the 20-item version correlated at 0.96 (FFMQ20; Hou et al., 2014). The FFMQ20 was used in the current study to minimize response burden, and it demonstrated satisfactory internal consistency ($\alpha_{T0} = 0.70$, $\alpha_{T1} = 0.78$, $\alpha_{T2} = 0.79$).

The Interpersonal Mindfulness in Parenting Scale was designed to measure parents' mindfulness in the context of child-rearing (Duncan et al., 2009). Parents rated on a 5-point Likert scale, from 1 = *Never true* to 5 = *Always true*. The 23-item Chinese IMPS (IMPS23) demonstrated satisfactory psychometrics (Lo et al., 2018). It also demonstrated good internal consistency in the current study ($\alpha_{T0} = 0.83$, $\alpha_{T1} = 0.87$, $\alpha_{T2} = 0.88$).

Parenting Practices

The Multidimensional Assessment of Parenting Scale (MAPS) was designed to measure parenting practices of different domains (Parent & Forehand, 2017). It contained 34 items rated on a 5-point Likert scale from 1 = *Never* to 5 = *Always*. Item scores were summed to measure two broad dimensions of positive parenting (POS) and negative parenting (NEG). The Chinese MAPS demonstrated satisfactory reliability and validity (Ahemaitijiang et al., 2021b). It also demonstrated excellent internal consistency in the current study ($\alpha_{POS,T0} = 0.91$, $\alpha_{POS,T1} = 0.91$, $\alpha_{POS,T2} = 0.90$, $\alpha_{NEG,T0} = 0.84$, $\alpha_{NEG,T1} = 0.87$, $\alpha_{NEG,T2} = 0.86$).

Parental Psychopathology

The 9-item Patient Health Questionnaire (PHQ9) was a well-established screener of depressive symptoms (Kroenke & Spitzer, 2002). Parents rated on a 4-point Likert scale, from 0 = *Not at all* to 3 = *Nearly every day*. The Chinese PHQ9 demonstrated satisfactory reliability and validity (Yu et al., 2012). It also demonstrated good internal consistency in the current study ($\alpha_{T0} = 0.85$, $\alpha_{T1} = 0.82$, $\alpha_{T2} = 0.84$).

The 7-item Generalized Anxiety Disorder (GAD7) was also a well-established screener of anxiety symptoms (Spitzer et al., 2006). Parents rated on a 4-point Likert scale, from 0 = *Not at all* to 3 = *Nearly every day*. The Chinese GAD7 demonstrated satisfactory psychometrics (Zeng et al., 2013). It also demonstrated excellent internal consistency in the current study ($\alpha_{T0} = 0.93$, $\alpha_{T1} = 0.90$, $\alpha_{T2} = 0.89$).

Child Psychopathology

The Strengths and Difficulties Questionnaire (SDQ) was a common measure of child behavior (Goodman, 1997). It contained 25 items rated on a 3-point Likert scale, from 0 = *Not at all* to 2 = *Always*. Item scores were summed to reflect two broad dimensions of internalizing (INT) and externalizing (EXT). The Chinese SDQ demonstrated satisfactory psychometrics (Lai et al., 2010). It also demonstrated satisfactory internal consistency in the current study

($\alpha_{INT,T0}=0.74$, $\alpha_{INT,T1}=0.68$, $\alpha_{INT,T2}=0.76$, $\alpha_{EXT,T0}=0.71$, $\alpha_{EXT,T1}=0.67$, $\alpha_{EXT,T2}=0.71$).

Data Analyses

Descriptive summaries of the demographics and outcome measures were examined. Internal consistency of measures was assessed using Cronbach's alpha. Analyses were performed on an intention-to-treat basis. Per-protocol analysis was conducted based on course attendance, defined as participation in at least six of the eight treatment sessions. Between-group effect sizes (Cohen's *d*) were computed at each time point using the differences and pooled standard deviations of the two groups. Within-group effect sizes were determined separately for each group, based on the mean differences from baseline, their respective standard deviations, and the correlation between time points.

Linear mixed models (LMMs) with an unstructured covariance pattern were built to account for any dependence among data collected from the same parent and from the same condition. Examine the efficacy of the localized MP program. Each outcome measure was modeled separately, with time of measurement, group assignment, and their interaction as predictors. Missing data were not replaced; as full information maximum likelihood allows analysis of data with missingness, all data available were used in each LMM (i.e., an advantage over traditional approaches such as repeated measures ANOVA; Kwok et al., 2008). Logistic regression was conducted to evaluate whether missingness was independent of group assignment, demographic variables, and baseline value primary outcome. There were no significant group differences by missingness.

Assumption checks for the LMMs indicated that the assumptions of normality and homoscedasticity were reasonably supported across all outcomes. Although the Shapiro–Wilk test revealed statistically significant deviations from normality in most outcomes, the result for SDQ-EXT was non-significant ($p=0.859$). Nevertheless, Q-Q plots of residuals for all outcomes appeared reasonably linear, suggesting that the deviations from normality were not substantial. Given that the Shapiro–Wilk test could detect even minor deviations from normality in larger samples, greater emphasis was placed on visual diagnostics to assess the practical significance of these deviations. Similarly, scatterplots of residuals versus predicted values showed no discernible patterns for most outcomes, supporting the assumption of homoscedasticity. Although slight upward trends and significant Levene's test results were observed in IMPS23 and MAPS-POS, these deviations were minor and not indicative of severe heteroscedasticity. Considering the demonstrated robustness of LMMs to moderate violations of normality and homoscedasticity (Schielzeth et al., 2020), and based on acceptable visual diagnostics, data transformation was considered unnecessary to preserve interpretability and model integrity.

Results

Acceptability

Although 38 of the 121 parents assigned to the treatment condition did not start intervention and 47 of the 127 parents in the waitlist-control condition did not complete any assessment (Fig. 1), these were due mostly to scheduling difficulties and should be considered independently from program acceptability. Among the 83 parents assigned to the treatment condition and who completed at least a partial assessment, 58 (70%) attended six or more of the eight sessions (i.e., > 75% attendance) and 12 (14%) attended fewer than half the sessions. Ten (12%) parents withdrew or dropped out of their treatment group, and 11 (14%) waitlist-control parents did so prior to completing all three assessments. These parents either withdrew from the study due to scheduling conflicts or stopped responding despite repeated prompts (see Fig. 1 for details on withdrawals and dropouts).

Efficacy

Intention-to-Treat Analyses

Table 2 lists the descriptive summary of each outcome measure for both treatment and waitlist-control conditions at all time points, within- and between-group effect sizes, and the LMM results on the interaction between Time and Group (also see Fig. 2). Results were not moderated by the age of the target child or other demographics ($p>0.10$). Therefore, basic LMM results were presented. To lower the risk for committing a type I error in simultaneously testing nine LMMs, the significance value for these tests was adjusted by using Bonferroni correction to 0.0056.

Parenting Stress

There was a greater decrease in parenting stress among parents who were assigned to the MP program than those in the waitlist-control condition. PSS results indicated a Time × Group interaction at T2, estimate = −3.59 [95% CI: −5.31, −1.87], $p<0.001$, and of borderline significance at T1, $p=0.009$. No main effects of Time or Group were indicated, $p_{T1}=0.038$, $p_{T2}=0.039$, and $p_{Group}=0.748$.

Mindfulness

FFMQ20 results indicated a Time × Group interaction at both T1, estimate = 5.41 [95% CI: 3.24, 7.59], $p<0.001$,

Table 2 Linear mixed model results on outcome measures

	M (*SD*)		$M_{\text{change from baseline}}$ (*SD*)		Within-group effect size		Between-group effect size (treatment–waitlist-control)	*p*-value of Time × Group interaction[†]
	Treatment	Waitlist-control	Treatment	Waitlist-control	Treatment	Waitlist-control		
Parenting Stress Scale								
T0	50.77 (6.28)	50.46 (7.02)						
T1	45.48 (7.81)	48.96 (7.75)	−4.82 (7.03)	−2.16 (5.35)	−0.69 [−0.95, −0.42]	−0.29 [−0.50, −0.08]	−0.45 [−0.81, −0.08]	0.009
T2	45.40 (7.52)	49.19 (7.55)	−4.80 (5.37)	−1.15 (4.69)	−0.69 [−0.92, −0.47]	−0.16 [−0.31, 0.00]	−0.50 [−0.85, −0.15]	**< 0.001**
20-item Five Facet Mindfulness Questionnaire								
T0	55.17 (6.70)	58.51 (6.55)						
T1	59.64 (7.86)	57.57 (6.19)	4.99 (6.43)	−0.43 (5.83)	0.66 [0.43, 0.89]	−0.06 [−0.31, 0.18]		**< 0.001**
T2	60.34 (7.86)	58.75 (7.10)	4.97 (6.74)	0.39 (5.89)	0.66 [0.42, 0.91]	0.05 [−0.15, 0.26]	0.21 [−0.13, 0.56]	**< 0.001**
23-item Interpersonal Mindfulness in Parenting Scale								
T0	64.03 (9.89)	67.46 (7.79)						
T1	70.88 (10.34)	69.00 (8.40)	6.16 (8.63)	0.84 (7.82)	0.60 [0.38, 0.82]	0.10 [−0.16, 0.36]	0.20 [−0.16, 0.55]	**< 0.001**
T2	71.83 (10.72)	67.60 (8.07)	7.62 (8.82)	−0.38 (6.63)	0.72 [0.48, 0.96]	−0.05 [−0.25, 0.16]	0.44 [0.09, 0.80]	**< 0.001**
Multidimensional Assessment of Parenting Scale—Positive Parenting								
T0	57.75 (10.28)	57.23 (9.17)						
T1	58.87 (10.40)	56.46 (8.85)	1.09 (6.51)	−0.78 (6.61)	0.10 [−0.04, 0.25]	−0.09 [−0.30, 0.12]	0.25 [−0.12, 0.61]	0.118
T2	59.05 (9.57)	56.71 (8.26)	0.88 (7.64)	−0.22 (5.70)	0.09 [−0.10, 0.28]	−0.03 [−0.19, 0.14]	0.26 [−0.09, 0.61]	0.246
Multidimensional Assessment of Parenting Scale—Negative Parenting								
T0	48.77 (8.50)	48.13 (8.81)						
T1	44.92 (9.75)	45.06 (8.14)	−4.17 (7.40)	−2.43 (6.73)	−0.46 [−0.67, −0.26]	−0.28 [−0.51, −0.06]	−0.02 [−0.37, 0.34]	0.299
T2	43.77 (8.13)	46.31 (8.58)	−4.65 (6.78)	−1.40 (7.29)	−0.55 [−0.77, −0.33]	−0.16 [−0.37, 0.05]	−0.30 [−0.65, 0.05]	0.016
9-item Patient Health Questionnaire								
T0	9.26 (5.10)	7.87 (4.77)						
T1	6.29 (4.24)	7.17 (4.09)	−2.71 (4.49)	−1.10 (4.17)	−0.58 [−0.83, −0.33]	−0.25 [−0.51, 0.01]	−0.21 [−0.57, 0.15]	0.017
T2	6.48 (3.60)	6.68 (4.64)	−2.66 (4.50)	−1.31 (3.82)	−0.61 [−0.88, −0.34]	−0.28 [−0.49, −0.08]	−0.05 [−0.38, 0.28]	0.040
7-item Generalized Anxiety Disorder								
T0	9.43 (5.30)	8.34 (5.43)						
T1	6.48 (4.00)	7.09 (4.61)	−3.09 (4.70)	−1.67 (4.67)	−0.65 [−0.90, −0.39]	−0.33 [−0.58, −0.08]	−0.14 [−0.50, 0.21]	0.064
T2	5.97 (3.66)	6.21 (4.29)	−3.37 (4.85)	−2.12 (4.37)	−0.74 [−1.02, −0.46]	−0.45 [−0.68, −0.21]	−0.06 [−0.40, 0.28]	0.099
Strengths and Difficulties Questionnaire—Externalizing								
T0	9.58 (3.66)	9.53 (3.27)						
T1	8.66 (3.14)	8.92 (3.32)	−1.14 (2.65)	−0.48 (2.13)	−0.34 [−0.53, −0.15]	−0.15 [−0.33, 0.04]	−0.08 [−0.44, 0.27]	0.165
T2	8.67 (3.19)	9.00 (3.64)	−0.70 (2.72)	−0.49 (2.33)	−0.21 [−0.40, −0.01]	−0.14 [−0.29, 0.02]	−0.10 [−0.43, 0.24]	0.531
Strengths and Difficulties Questionnaire—Internalizing								
T0	7.90 (3.78)	7.44 (3.82)						
T1	7.15 (3.45)	7.27 (3.42)	−0.58 (2.40)	−0.43 (2.66)	−0.16 [−0.32, 0.00]	−0.12 [−0.33, 0.08]	−0.04 [−0.39, 0.32]	0.703
T2	7.12 (3.54)	6.80 (3.73)	−0.65 (2.53)	−0.39 (2.62)	−0.18 [−0.35, 0.00]	−0.11 [−0.28, 0.06]	0.09 [−0.25, 0.43]	0.560

Note. Results were from intention-to-treat analyses. *T0*, Baseline; *T1*, post-intervention or 8-week post-baseline; *T2*, 2-month follow-up or 16-week post-baseline. Within-group effect size indicates the change in score at subsequent times (i.e., T1 or T2) in reference to T0

[†]To lower the risk for committing a type I error in simultaneously testing nine LMMs, the significance value for these tests was adjusted by using Bonferroni correction to 0.0056. Results that reached statistical significance are highlighted in bold

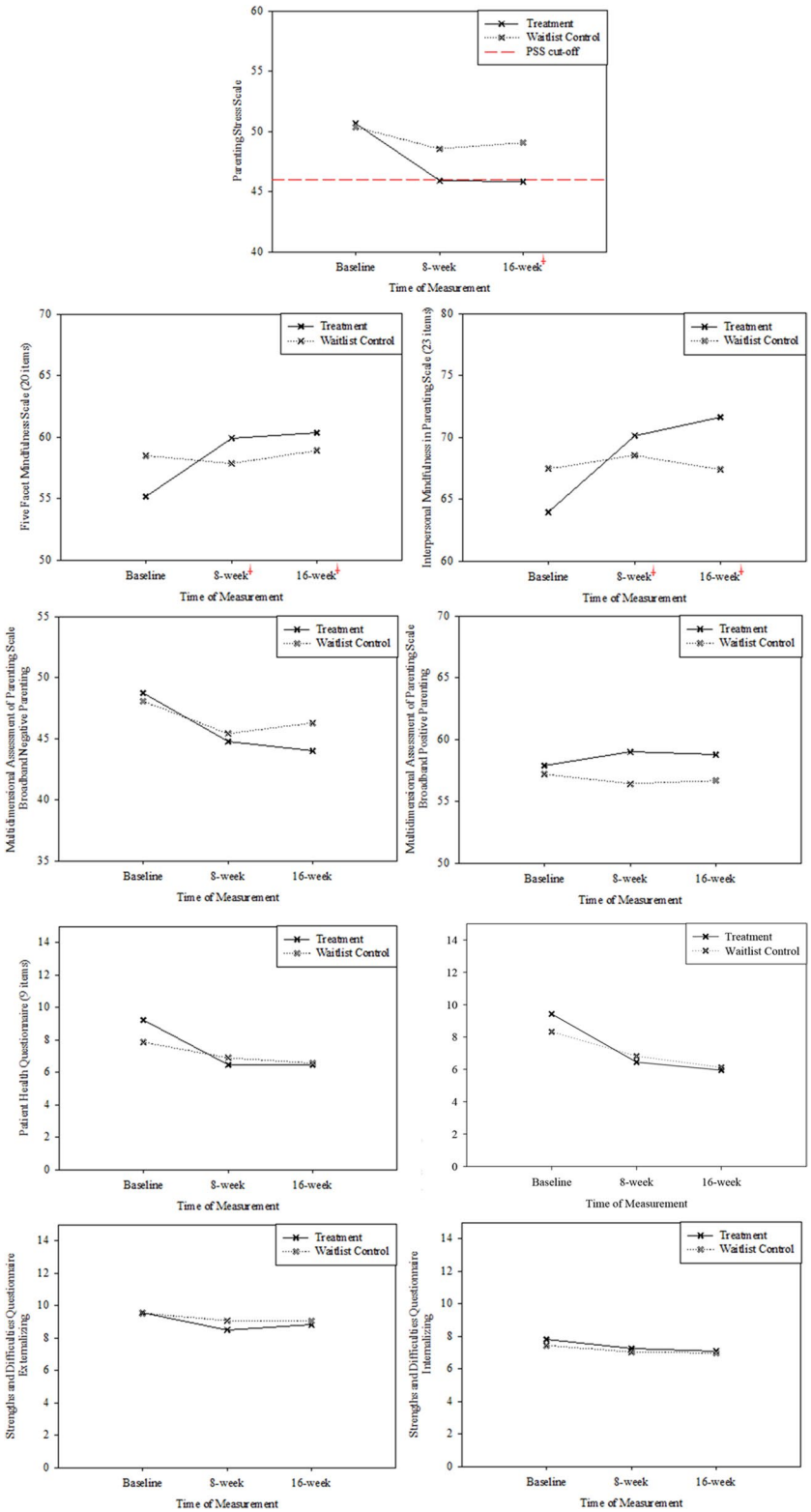

Fig. 2 Estimated marginal means of fitted models for outcome measures. *Note*. Results were from intention-to-treat analyses. The *y*-axis shows scores on a given measure in each panel. The turned dagger indicates significant difference in decrease from baseline between treatment and waitlist-control groups

and T2, estimate = 4.81 [95% CI: 2.68, 6.93], $p < 0.001$, and a main effect of Group, estimate = − 3.34 [95% CI: − 5.41, − 1.28], $p = 0.002$. Time had no main effect on FFMQ20, $p_{T1} = 0.442$ and $p_{T2} = 0.597$. Similar results were observed on IMPS23; Time interacted with Group at both T1, estimate = 5.12 [95% CI: 2.25, 7.99], $p < 0.001$, and T2, estimate = 7.77 [95% CI: 5.13, 10.41], $p < 0.001$. Neither Time nor Group had a main effect on IMPS23, $p_{T1} = 0.320$,

$p_{T2} = 0.936$, and $p_{Group} = 0.013$. These results indicated a greater increase in both context-general and parenting-specific mindfulness after being assigned to the MP program than to the waitlist-control condition. Such treatment effects were maintained 2 months after the intervention. Although parents in the treatment group reported at T0 lower levels of dispositional mindfulness than those in the waitlist-control condition, the two groups did not differ in their T0 levels of mindful parenting.

Parenting Practice

Neither Time × Group interactions nor any main effects of Time or Group reached statistical significance for MAPS-NEG, $p_{T1\times Group} = 0.299$, $p_{T2\times Group} = 0.016$, $p_{T1} = 0.007$, $p_{T2} = 0.044$, and $p_{Group} = 0.615$. Similar null results were observed for MAPS-POS, $p_{T1\times Group} = 0.118$, $p_{T2\times Group} = 0.246$, $p_{T1} = 0.392$, $p_{T2} = 0.544$, and $p_{Group} = 0.651$. These results indicated no significant changes in self-perceived parenting practice following participation in the MP program.

Parent Psychopathology

PHQ9 results did not reach statistical significance, $p_{T1\times Group} = 0.017$, $p_{T2\times Group} = 0.040$, $p_{T1} = 0.081$, $p_{T2} = 0.011$, and $p_{Group} = 0.083$. Results on GAD7 indicated no Time × Group interactions, $p_{T1\times Group} = 0.064$ and $p_{T2\times Group} = 0.099$, and no main effect of Group, $p_{Group} = 0.196$. Main effect of Time on GAD7 did not reach statistical significance at T1, $p_{T1} = 0.009$, but it did at T2, estimate = −2.20 [95% CI: −3.28, −1.13], $p < 0.001$. These results indicated a natural decrease in parental anxiety by 2 months following intervention.

Child Psychopathology

SDQ-EXT results indicated no Time × Group interactions, $p_{T1\times Group} = 0.165$ and $p_{T2\times Group} = 0.531$, and no main effects of Time or Group, $p_{T1} = 0.153$ and $p_{T2} = 0.108$, and $p_{Group} = 0.956$. Similar null results were observed for SDQ-INT, $p_{T1\times Group} = 0.703$, $p_{T2\times Group} = 0.560$, $p_{T1} = 0.228$, $p_{T2} = 0.138$, and $p_{Group} = 0.521$. These results indicated that neither child externalizing nor child internalizing changed significantly during the study period.

Per-Protocol Analyses

Excluding parents with an attendance of < 75% from the treatment group, results were largely consistent with those from intention-to-treat analyses (see Supplementary Tables S1-S2 in Online Resource 1). Additional effects from per-protocol analyses included a statistically significant Time × Group interaction on PSS at T1, estimate = −4.43 [95% CI: −6.72, −2.14], $p < 0.001$. Relative to waitlist-control parents, those who completed at least six sessions showed a greater reduction in parenting stress shortly after the treatment ($d = -0.68$). Furthermore, per-protocol analyses on PHQ9 revealed a Time × Group interaction at T1, estimate = −2.49 [95% CI: −4.04, −0.94], $p = 0.002$, but not at T2, $p = 0.019$. This indicated that, relative to waitlist-control parents, those who completed at least six sessions showed a greater reduction in depressive symptoms shortly after the treatment ($d = -0.41$) but not 2 months later. The main effect of Time on PHQ9 was not indicated at T1, $p = 0.079$, but reached statistical significance at T2, estimate = −1.32 [95% CI: −2.24, −0.40], $p = 0.005$. Taken together, there might be a greater immediate decrease in depressive symptoms among parents who attended at least six sessions of the MP program than their waitlist-control counterparts. However, by 2 months following intervention, the decreases in depressive symptoms did not differ across parents in the two conditions.

Discussion

The current RCT was among the first studies to rigorously examine the acceptability and efficacy of the eight-session MP protocol localized for parents in Hong Kong. In addition to using an experimental design, the current study strived for satisfactory clinical standards. Localization of the MP protocol was done through teamwork by several local experts in mindfulness. All facilitators in the current RCT were experienced mindfulness teachers and trained by the original protocol developer. Clinical governance was also upheld in the current RCT through regular individual supervision.

With the majority of parents assigned to the treatment group completing six or more of the eight sessions of the MP program, this showed that parents in Hong Kong could potentially benefit from the full MP program. Moreover, considering the attrition rate of 20–26% across parenting programs (Chacko et al., 2016) and the disruptions and scheduling difficulties under the COVID-19 pandemic, the program attrition rate of 12% in the current study seemed low. At the same time, families in Hong Kong experienced many challenges during the COVID-19 pandemic (Chan, 2022; Wang et al., 2021; Yung et al., 2023), which might have prompted the greater needs and hence retention among parents in the current intervention. The retention observed in the current study might also be attributed to cultural factors; considering the emphasis in Chinese culture on compliance to authorities or professional recommendations, parents in the current study might be less likely than their Western counterparts to drop out of a program. Clarifications on such pandemic-related complications and cultural differences

called for further research such as direct comparisons of groups or circumstances. With the high rate of parents completing at least 75% of the treatment sessions and the low attrition observed, the current study shed light on Chinese parents' receptiveness and potential benefits from the localized MP program. Particularly, the comparable withdrawal and dropout rates across the treatment and waitlist-control conditions provided further support for implementing the full MP program in Hong Kong.

Regarding treatment efficacy, the localized MP program had a moderate-to-large effect on reducing parenting stress and enhancing mindfulness as well as mindful parenting among parents in Hong Kong. More importantly, treatment effects were sustained 2 months after program completion. These results were consistent with the primary objectives of the MP program (Bögels & Restifo, 2014) and the Western literature (Anand et al., 2023; Burgdorf et al., 2019). The current study supported not only the theoretical benefits and empirical efficacy of the MP program but also its applicability across different cultural groups. Considering elevated parenting stress being one of the eligibility criteria in the current study, it might be worthwhile implementing this program at agencies serving particularly families seeking services for challenges or emotional distress in their households. Furthermore, as more than 70% of the participants were working parents, the current findings supported routine implementation of this MP program at workplaces as a wellness program to employees with children.

Although the theories underlying MP and existing findings (Ahemaitijiang et al., 2021a; Emerson et al., 2021) suggest that completion of an MP program leads to improvements in self-reported parenting, the current study did not detect such treatment effects. While the changes in negative parenting appeared to be moderate within the treatment group and small within the waitlist group, the small between-group effect sizes observed did not reach statistical significance after adjusting the critical value to reduce false positive rates in multiple testing. The current sample size afforded adequate statistical power to detect an effect size of at least 0.50 but not enough if the true effect was small (e.g., $d_{\text{between-group}} = 0.25–0.26$ for MAPS-POS).

The effects of MP on parental and child psychopathology were also not apparent in the current study. When excluding parents who attended fewer than 75% of the treatment sessions, results demonstrated a greater reduction of depressive symptoms than natural changes at the end of the MP program. However, this treatment effect on parental depression appeared to dissipate by 2 months after treatment, leaving only evidence for natural recovery (i.e., time effect at 2-month follow-up). It was possible that parental depression recovered naturally with or without treatment; however, completion of the MP program helped accelerate the recovery.

As aforementioned, null results could be attributed to the limited statistical power of the current study to detect small changes. Another reason for these null results might be the low severity of parental and child psychopathology at baseline in the current study. For example, individuals meeting diagnostic criteria for depression scored an average of 16.87 on the PHQ9 in a local validation study (Yu et al., 2012), whereas parents in the current study scored at baseline an average of 7.87 among the waitlist-control group and 9.26 among the treatment group. Similarly, child emotional and behavioral problems reported by parents in the waitlist-control group scored an average of 16.92, and those reported by parents in the treatment group scored an average of 17.32 on the Total Difficulties Scale of the SDQ, barely reaching the clinical cut-off at 17 as established in Lai et al. (2010)'s local validation study. Changes tend to be smaller among those showing greater initial skills or lower initial psychopathology (Vergara et al., 2022). The subclinical nature of participants in the current study might have contributed to the null results observed.

Coinciding with the COVID-19 pandemic was one unique feature of the current RCT. The fluctuating pandemic across a 3-year span had introduced many challenges to families in Hong Kong, including health-related stress, financial constraints, disruption to children's and families' routines, and conflicts in the family (Chan, 2022; Wang et al., 2021; Yung et al., 2023). While the current results supported MP's treatment effects on parenting stress and parental mindfulness, the null effects on perceived parenting, parental psychopathology, and child outcomes could be specific to the context of the COVID-19 pandemic. For example, parents inevitably had to adjust their schedules around those of their children in response to public health restrictions under the COVID-19 pandemic. To accommodate disruptions under the pandemic and parents with different kinds of schedules, each session was shortened from 3 to 2.5 hr, and the MP program was offered at various times of the week in the current study. However, challenges persisted among parents in the current study to arrive on time or stay for the full session due to other life responsibilities. Parents also occasionally fell asleep during mindfulness or imagery exercises in a session. All of these might have discounted parents' engagement and benefits from the current MP program.

While the hybrid delivery, an adaptation to meet the public health requirements under the COVID-19 pandemic, might have been more flexible in meeting the scheduling needs among different parents, it might have also contributed to the null or diminished results observed in the current study. Initial results on web-based variants of the MP program supported promising but weaker benefits of the treatment (Fernandes et al., 2022; Potharst et al., 2019). Moreover, quite a number of parents in the current study expressed

appreciation for the time away from their responsibilities as a parent and the space for self-care.

Limitations and Future Research

While the current study provided empirical support for the MP program in reducing parenting stress and increasing mindfulness beyond natural changes among the Chinese parents in Hong Kong, several limitations should be considered along with the results reported. First, the current sample size afforded adequate statistical power to detect only effects of at least a moderate size. A larger sample than the current one is necessary for testing any smaller effects of the MP program, such as the small immediate and longer-term effects of the MP program on parenting practice and parental as well as child psychopathology observed in the current study.

Second, while showing elevated parenting stress, the current sample appeared subclinical in terms of depressive or anxiety symptoms. These parents also reported subclinical levels of internalizing or externalizing behaviors for their children. Considering effects of the MP program on parental and child psychopathology were found among clinical samples (e.g., Bögels et al., 2014), future studies should use a more diverse sample and examine if the MP program has differential effects on psychopathology in parents and children with varying levels of clinical needs. In addition to symptomatology, moderating effects of stress level or type of clinical concern on the efficacy of the MP program can be explored with a larger and more diverse sample.

Third, the current study measured only parenting practices that were related primarily to the management of child behaviors. There are many different dimensions for understanding parents' behaviors toward their children. Future studies may assess overreactive parenting (i.e., a treatment target in MP that is attributable to parenting stress) and other qualities of parenting (e.g., parent–child relationship, coparenting, family functioning, practices unique to the Chinese culture) in examining the treatment effects of the MP program.

Fourth, the use of self-report and single informant might have introduced biases into the current results. The shared variance in using a single method or a single informant across measures may inflate the associations observed in a study (Lindell & Whitney, 2001; Podsakoff et al., 2003). Parents may also over- or under-report on the measures for various reasons (e.g., placebo effect, impression management, change in perspective; see Emerson et al., 2021; Kil et al., 2021). Future studies may consider using multiple methods in assessing changes among parents and their children, such as the inclusion of ratings by other caregiving adults in the family or at school. Ratings by observers who are blind to treatment assignments may also be used to establish objective changes in parenting behaviors and parent–child interactions.

Last but not least, under the health restrictions related to the COVID-19 pandemic, some of the MP sessions were delivered in-person and some were online. As aforementioned, it was an ethical and clinical decision to limit the wait among parents assigned to but had yet received the MP program and also to minimize the disruption to those who had already started the treatment. There were not enough data to test for any differential effects by delivery mode. With the increased popularity in applying technology to mental health care (Zale et al., 2021), future research may compare the feasibility and effectiveness of the MP program delivered in-person, online, versus in different hybrid modes.

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Author Contribution To ensure objectivity and reliability of the current findings, statistical analyses were conducted by authors without any potential conflict of interest. C.L.Y.M.P., S.M.B., and S.Y.S.W. conceived the trial aims and study design. C.L.Y.M.P. was also involved in the local mindfulness expert group in translating the current intervention. As contributing members from NLPRA, P.K.C.C. was the leading clinician in this research project, providing consultation on protocol implementation and facilitating some of the treatment groups, whereas L.P. liaised with local stakeholders and took the lead in recruitment planning. A.K.C. supervised data acquisition and led on data analysis as well as manuscript writing. NLPRA had full access to all the data and would take responsibility for the integrity of the data in the study. A.K.C. and D.C.C.C. would be responsible for the accuracy of data analysis. All authors reviewed and provided critical revisions to the manuscript and approved the final version of the manuscript.

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Data Availability Data, materials, and code used in the current study are available upon reasonable request.

Declarations

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Joint Chi-

nese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (Reference: 2019.059). The current study was also pre-registered as a part of a larger project on the Chinese Clinical Trial Registry (Trial Registration Number: ChiCTR1900022923).

Informed Consent Informed consents were obtained from all individual participants included in the study, prior to their participation. Trained research assistants first explained the terms on the study information sheet and consent form to all participants at a briefing session, either in person or online. All participants received the written study information sheet and consent form to follow along and were given time to consider the content as well as to raise any questions or concerns they might have. Informed consents were obtained only after participants indicated an understanding of the content, particularly about their voluntary participation and rights to withdraw anytime without negative consequences.

Conflict of Interest The funding source had no further role in the study design; in the collection, analysis, or interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Prof. Susan M. Bögels has written books and provided teacher training on mindful parenting, for which she receives royalties and honoraria. All other authors have no relevant financial or non-financial interests to disclose.

Use of Artificial Intelligence AI software was not used in the preparation of this manuscript.

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