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The Effectiveness of Mindfulness Training on Family Cohesion and Public Health of Parents of Children with Special Learning Disabilities

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ARTICLE INFO	ABSTRACT
<p>Article History: Received 17 November 2022 Received in revised form 1 January 2023 Accepted 27 February 2023 Available online 2 March 2023</p>	<p>Aim: To assess the efficacy of mindfulness-based training on parental family cohesion and public health for those with special learning disabilities. Methods: A quasi-experimental approach was employed with a pre-test-post-test design, utilizing a control group. The statistical population sampled parents of children with learning hardships in Tehran's primary schools. Twenty-eight parents of children from various government centers were selected as a statistical sample using an available sampling method and were randomly assigned to experimental and control groups. Data were collected using questionnaires. The experimental group received mindfulness training in eight 90-minute sessions twice a week, while the control group did not receive any training. The data was analyzed using SPSS software version 22 with both covariance and independent t-tests. The presented statistical data tables were descriptive and inferential. Results: The results indicated that mindfulness-based training had a significant impact on family cohesion, women's public health, and men's public health ($p < 0.05$), with effect sizes of 0.748, 0.913, and 0.484, respectively. Conclusion: In conclusion, the findings highlight the potential benefits of mindfulness-based training in improving family cohesion and public health for both genders. The study's findings suggest that mindfulness-based training can enhance family unity and improve the health of parents in households with children with special learning needs.</p>
<p>Keywords: Mindfulness Training, Family Cohesion, Public Health, Parents of Children with Learning Disabilities</p>	

1. INTRODUCTION

Specific learning disorder is a developmental disorder with neurological origins that manifests in children who possess normal intelligence levels above 85 and no apparent brain damage or sensory disabilities [1-3]. A specific learning disorder refers to a disorder in one or more fundamental psychological processes that impact understanding and use of spoken or written language. This disorder can manifest as an inability to listen, think, speak, read, write,

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or perform mathematical calculations. However, it does not include learning difficulties that stem primarily from visual, hearing, or motor disabilities, mental and intellectual disabilities, emotional disorders, or environmental, cultural, and economic factors [1]. Learning disorder, also known as a neuro-biological disorder in cognitive processing or learning, is a result of unspecified brain activity. Due to this brain passivity, those with learning disabilities acquire and process information differently from what is expected of a child or adult in typical circumstances [4]. The Diagnostic and Statistical Manual of Mental Disorders defines specific learning disorder as a type of neurodevelopmental disorder characterized by disrupted proper brain or central nervous system development. This disorder impacts brain and nervous system function causing negative effects on an individual's ability to learn, remember, and regulate emotions as they mature [5].

The exact estimation of the prevalence of learning disorders is uncertain due to the variety of terms as well as different definitions and related evaluation methods. According to Karimi (2019) [6], this lack of a solid foundation creates limitations. The American Psychiatric Association reports that specific learning disorders in academic fields such as reading, writing and mathematics account for 5-15% of primary school children from different languages and cultures [7-9]. The incidence rate of learning disorders in adults remains unknown but is roughly assumed to be 4%. These disorders can have a profound impact on family life, resulting in heightened anxiety, stress, social isolation, and indecisiveness among caregivers. Academic research has found that parents who raise children with learning disorders experience greater stress than those with typically developing children [10-12].

The impact of having a child with a disability on the family may differ depending on the family's life cycle stage. During early childhood years before starting school, children have limited influence on their parents and the community, and are usually not identified as problematic until they enter school. Nonetheless, in the initial years of elementary school, children often encounter restlessness and discomfort. During this time, parents and siblings must adapt to the child's disabilities [13]. The diagnosis of a child's learning disorder is unpredictable. As a result, families must perform specific tasks and activities during their school years to adapt to the child's diagnosis and education. Previous research on parent-child relationships primarily focused on the psychological effects that parents have on their children. However, recent research has shifted its emphasis to examining the effects that children have on their parents.

Naderi and Seif Naraghi (2016) claim that parents of children with learning disabilities may erroneously regard themselves as being directly accountable for their child's disabilities and experience guilt, particularly as a result of genetic learning disabilities, incapability to take care during pregnancy, consumption of drugs, or substance abuse. Typically, negative emotions such as worthlessness, shame, and guilt may prompt certain parents to conceal their child's learning disorder. The presence of a disabled child can have a profound effect on the psychological and social well-being of family members [14-15]. Studies have consistently shown that having a disabled child in the family can cause significant stress and negatively impact the mental health of parents [16]. Research indicates that parents of children with learning disabilities are more likely to experience psychological stress or tension [17].

A study in 2017 showed that parents of children with learning disabilities face increased parental responsibilities, resulting in a heightened risk of depression, physical health issues, and reduced quality of life [18]. The heightened risk of physical health issues among parents of children with learning disabilities has been explored in a study by Liang (2021) [19].

In fact, over time and with improved health and safety standards, societal attention has shifted towards objective issues related to public health and well-being rather than solely longevity and treatment. Measuring public health as a reflection of overall wellness has become prevalent in the healthcare system. Public health has emerged as a crucial area of research over the past two decades, particularly in the field of clinical research. Psychiatrists have indicated that a person's perspective and behavior could have an impact on public health. Therefore, various human biological and psychosocial factors tend to affect each other. Hence, families with a member experiencing such factors may be affected.

Meanwhile, family cohesion is an objective metric that assesses the emotional intimacy between family members and the strength of emotional bonds among them [20]. Coherence, on the other hand, measures the psychological, cognitive and emotional distance or proximity between individual members and is determined through their emotional connections. High levels of family cohesion have a positive impact on the well-being of parents who have

children with different psychological disorders [20]. This is due to the fact that the interaction among family members varies according to subsystems within each family, for instance, child and parent relationships, sibling and extended family connections, as well as cultural beliefs like over-supporting versus appropriate upbringing and passivity versus understanding. The quality of family interaction is determined by coherence and adaptability, as interactions can range from facilitating to malfunctioning.

The practice of mindfulness and being present in the moment has been utilized for an extended period to alleviate or eradicate a wide variety of life problems and distress, including stress, anxiety, depression, behavioral issues, and interpersonal conflicts. This technique aids individuals in achieving inner peace and attentiveness in the present moment, resulting in improved outcomes in their lives [21].

One innovation in psychological treatments is the incorporation of Eastern spiritual traditions, such as mindfulness meditation techniques, with conventional cognitive therapy, known as the third wave of psychological treatments [22]. Mindfulness is a type of meditation that originates from Eastern religious teachings and rituals, primarily in Buddhism and other disciplines that seek to promote conscious attention and awareness. Mindfulness centers on cultivating three qualities, namely, non-judgmental attitude, present-moment focus, and purposeful awareness and attention [23]. Focused attention on the present moment leads to the processing of all immediate experience elements, encompassing cognitive, physiological, or behavioral activities [24]. Through practicing mindfulness techniques, individuals become aware of their daily activities and recognize the automatic functioning of their minds in both the past and future [25]. By maintaining moment-to-moment awareness of their thoughts, feelings, and physical states, they are able to gain control over them and break free from the everyday automatic thinking focused on the past and future.

Mindfulness techniques and exercises aid parents in perceiving their thoughts differently in the present moment, eliminating the daily mindset with a focus on the past or future and enhancing their self-perception [26].

Numerous studies have confirmed the efficacy of mindfulness as a method. In 2020, Soroush Vala further confirmed its effectiveness in interventions for enhancing marital satisfaction and coping styles in parents of children with autism spectrum disorder. Ahmadi, Khaierati, and Ghobari Bonab (2019) conducted a study involving 320 mothers with children facing learning disabilities and confirmed that mindfulness-based training was effective in enhancing mothers' cognitive regulation of emotions and cognitive flexibility [27]. Likewise, Fatahi, Deldade Moghadam, and Taqhavi (2018) studied 30 mothers having children with learning disorders and found that mindfulness-based training was effective in enhancing mothers' resilience and happiness [28]. Ghazanfari et al. (2016) conducted a study on 34 mothers with children diagnosed with oppositional defiant disorder and found that a mindfulness-based parenting training program effectively improved their overall health [29]. The results indicate that the training was effective in improving their well-being. Belschner et al. (2020) found that mindfulness-based training effectively enhances parents' ability to tolerate discomfort caused by their child's obsessive-compulsive disorder [30].

The review of prior studies reveals that mindfulness-based therapy's impact on the mental health of mothers with children experiencing various psychological disorders has been evaluated. Additionally, no research has evaluated the treatment's effectiveness on family cohesion in households with children with specific learning disabilities. Therefore, considering the possible effects of having a child with a learning disability in the family, it would be valuable to investigate the effectiveness of mindfulness-based therapy on fathers' mental health and family cohesion.

2. METHOD

The present study utilized a quasi-experimental design featuring a pre-test-post-test methodology with a control group to examine the impact of mindfulness-based training as an independent variable on family cohesion and the public health of parents of children with special learning disorders as a dependent variable. The study's objectives and hypotheses warrant the practical nature of the design. The study's statistical population comprises parents with children afflicted by a specific learning disorder at government learning disorder centers in Tehran. To select the research sample, parents who aspired to attend the training course were chosen utilizing the available sampling method. In the first stage, we referred to Tehran's Organization of Exceptional Education to obtain the desired sample. After obtaining the necessary letter and coordinating with education, we selected several government centers

for learning disorders. After coordinating with the parents and verifying the inclusion criteria for the study (i.e., having a child with a learning disorder, parents aged between 30 and 50 years old, possessing a diploma or higher education, and belonging to a middle socio-economic class) as well as the exclusion criteria (i.e., missing more than two mindfulness protocol sessions), we randomly chose 28 parents to participate. Subsequently, we administered two questionnaires on family cohesion and public health to the participants. After that, 28 participants were randomly assigned to either the experimental or control group. The experimental group underwent mindfulness training while the control group did not receive any training. After the training period, two post-test questionnaires were administered to the parents of both groups.

3. MEASUREMENT TOOL

The Family Cohesion Questionnaire, developed based on Olson's hybrid model, employs a Likert scale to collect data on family dynamics. This instrument is widely used in counseling and research contexts and consists of 28 items completed by the children in the family. Responses range from "Completely agree" (score of 5) to "Completely disagree" (score of 1), with a possible total score between 28 and 140. Scores above 96 indicate a high level of family cohesion, whereas scores below 96 reflect a low level of cohesion. The questionnaire evaluates eight dimensions, including connection with parents, duration of interaction, emotional bonding, and marital relations. It has demonstrated strong internal consistency, with a Cronbach's alpha coefficient of 0.90, and overall reliability of 0.79.

The General Health Questionnaire (GHQ) is available in 12-, 28-, and 36-item formats, with the 28-item version being the most widely applied in Iran. This self-administered, paper-and-pencil instrument assesses four subscales— anxiety, depression, social dysfunction, and physical symptoms—each containing seven items. The Persian version has been validated and analyzed statistically using a simple Likert scoring method (0, 1, 2, 3) and SPSS software. Reported reliability coefficients for this version range from 0.84 to 0.92, with repeated measurements confirming its relative stability. Experts in psychiatry and psychology have also confirmed the questionnaire's cultural appropriateness and relevance to mental health assessment. In this version, items 1–7 measure physical symptoms, items 8–14 assess anxiety, items 15–21 evaluate social dysfunction, and items 22–28 assess depression. Reliability coefficients as high as 0.85 have been documented in Iranian samples.

4. RESEARCH IMPLEMENTATION METHOD

The study participants were chosen from parents who sought help at the Tehran learning disorders government center and were randomly assigned to either the experimental or control group. Due to the Covid-19 pandemic and subsequent health concerns, virtual links were employed to distribute questionnaires and hold online training sessions. For the pre-test, questionnaires on public health (Goldberg) and family cohesion were distributed in two sample groups. The experimental group comprised 14 parents (7 mothers and 7 fathers), divided into two groups of four parents and two groups of three parents. Subsequently, the experimental groups attended eight online sessions, each lasting 90 minutes, scheduled twice a week in a virtual space. After the intervention was completed, we administered two post-test questionnaires on public health and family cohesion to both the experimental and control groups. Ethical considerations of the research were taken into account.

- 1) Obtaining personal satisfaction from the subjects who answered the questions;
- 2) Not using parents' names and personal information in questionnaires and data analysis;
- 3) Confidentiality of information of parents and their children.

This research has a code of ethics from the Research Ethics Committee of Islamic Azad University- Science and Research Unit with code IR. IAU. SRB. REC. 1400.097.

The content of the research training program is based on the book " A Clinician's Guide to Teaching Mindfulness" written by Christian Wolff, J. Greg Serpa (2015) [31], as described in the following table:

Table 1. Exercises of each session

Sessions	Educational content of sessions
First	Familiarity with mindfulness: performing basic meditation, complete definition of mindfulness, eating with mindfulness (raisin exercise), familiarity with body scanning, end of session and homework
Second	Be Right in Your Place: Body Scan, Be Right in Your Place, Breathing Mindfulness
Third	Our Storytelling Minds: Mindfulness Walking Meditation, Our Storytelling Minds, Sound Meditation
Fourth	Cultivating Kindness: Practicing Loving Kindness, Rain, or Anchor Phrases
Fifth	Passion to be with everything as it is: a walking meditation with loving kindness
Sixth	Moving Forward: Walking Meditation with Loving Kindness, Moving Forward, Mindful Breathing with Expanding Space
Seventh	Finding the Compassion Within: Compassionate Body Scan, Finding the Compassion Within, Supportive Touch, and the Self-Compassion Pause
Eighth	Improving resilience: compassionate breathing, improving resilience, using empowerment, mindfulness

In order to measure the validity of this educational content, the CVR method (Lawshe) and a survey of 5 experts were used. The value of CVR equal to 0.99 was obtained, which indicates the confirmation of content validity of training sessions by experts. Data were analyzed using analysis of covariance and independent t-test. The ethical considerations of the research are:

- 1) Obtaining personal satisfaction from the subjects who answered the questions;
- 2) Not using parents' names and personal information in questionnaires and data analysis;
- 3) Confidentiality of information of parents and their children.

5. FINDINGS

28 families, each comprising a mother, a father, and a child, were divided into two groups for the study. The test group and control group were composed of 14 families each. The number of male and female individuals in each group is 14, which accounts for 33.3% of the total membership in the group. Additionally, among children, the control group comprises 9 girls, which is less than the 10 girls present in the test group. Similarly, the control group consists of 5 boys, which is more than the 4 boys in the test group. The test's significance level equals 0.323, which exceeds 0.05, thus rejecting the existence of a significant difference based on gender between the members of the control and test groups. The mean age of fathers was lower in the control group (41.79) than in the test group (41.93), while the mean age of mothers was higher in the control group (36.86) than in the test group (36.57). The mean age of girls was the same in both the control and test groups (9.67), whereas the mean age of boys was lower in the control group (9.20) than in the test group (9.60). The test's significance level is 0.906, which is greater than 0.05, resulting in the rejection of the existence of a significant difference between the control and test groups' members based on their age. Among parents, the number of diplomas in the control group (24 individuals) exceeded that of the test group (23 individuals). In contrast, the number of bachelor's degrees in the control group (4 individuals) was lower than that in the test group (5 individuals). For both the control and test groups of children, all selected sample members were enrolled in elementary school. The test's significance level is 0.660, indicating an absence of significant difference between the members since it is greater than 0.05.

Based on the results of the independent t-test, significant differences exist in the average scores of women's public health in the pre-test and post-test stages of the test group ($p \leq 0.05$). Women's public health scores in the pre-test stage (34.5) were significantly higher than their scores in the post-test stage (16.57), with an average difference of 17.93. There was a significant difference in the average public health scores between men in the test group during the pre-test and post-test stages ($p < 0.05$). Specifically, the average public health score for men in the test group was significantly higher during the pre-test stage (36.36) compared to the post-test stage (27.29), with a difference of 9.07.

There was no statistically significant difference in the mean scores of public health among women in the control group during both pre-test and post-test phases ($p < 0.05$). The average public health score of women in the control group during pre-test phase was marginally higher (34.57) than the score during the post-test phase (34.43). The difference in the average score was 0.14. There was no statistically significant difference in the average public health scores of men in the control group between the pre-test and post-test stages ($p < 0.05$). Notably, the average public health score for men in the control group during the pre-test stage (36.07) was slightly lower than the average score during the post-test stage (36.14), which resulted in a mere 0.07 difference in these averages. Additionally, there was no significant variation observed between the mean public health scores of men and women in the test and control groups during the pre-test phase ($p < 0.05$).

A statistically significant difference exists between the mean family cohesion scores of the test group during the pre-test and post-test stages ($p \leq 0.05$). Specifically, the mean family cohesion score of the test group during the pre-test stage (86.5) was markedly lower when compared to their mean score during the post-test stage (97.71). The average difference between these means amounts to 11.21. There was no significant difference between the mean family cohesion scores of the control group in the pre-test and post-test stages ($p < 0.05$). The pre-test average family cohesion score for the control group (86.57) was slightly higher than the post-test average (86.50), a difference of only 0.07 .

Additionally, there was no significant distinction in average family cohesion scores between the test and control groups during the pre-test stage ($p < 0.05$).

Prior to conducting the covariance test, the test's assumptions were analyzed, which include the stratification of the independent variable and the correlation between the dependent variable and the confounding variable. These assumptions have been met in this study.

Prior to conducting the covariance test, the test's assumptions were analyzed, which include the stratification of the independent variable and the correlation between the dependent variable and the confounding variable. Since mindfulness-based training serves as an independent research variable, it is categorical in nature, while public health and family cohesion are both relative. It is assumed that the dependent variable is normally distributed or closely approximates to it. To examine this matter, the Kolmogorov-Smirnov test was conducted using SPSS software, as reflected in the table below.

Table 2. Kolmogorov-Smirnov test results

Variable	Z test	Significance level
Public health	0.130	0.200
Family Cohesion	0.140	0.041

According to the information in Table 2, the public health variable is normal ($p < 0.05$) and the family cohesion variable ($0.041 < 0.05$). Therefore, the second assumptions of the covariance test have been met.

In the table below, the results of the covariance test are presented in relation to the effects of the factor variable on the family cohesion variable.

In the first row of this table, there is the modified model of the test, which shows the estimation of the sum of squared errors without considering the value of y-intercept (μ). It seems that a suitable model has been obtained with the small significance level (p value). On the other hand, if we do not consider the value of y-intercept to be zero, the factor of training based on mindfulness has had a significant effect on the mean of the variable of family cohesion with the value of $p = 0.000 < 0.05$. The effect value for each of these variables can be seen in the column at the end of the table in the covariance analysis model. The higher the value of this column for each row, the greater its effect on the dependent variable. Based on this, it can be seen that the training based on mindfulness has had an effect on family cohesion with a value of 0.748.

In the table below, the results of the covariance test are presented in relation to the effects of the factor variable on the public health variable of women.

Table 3. The output of the covariance test for the effectiveness of mindfulness-based training on family cohesion

Source	sum of squares	Degrees of freedom	average of squares	F	Significance level	effect value (Partial Eta Squared)
Modified model	905.039	2	452.519	38.009	0.000	0.753
y-intercept	147.577	1	147.577	12.396	0.002	0.331
mindfulness-based training	883.668	1	883.668	74.223	0.000	0.748
Pre-test family cohesion	24.717	1	24.717	2.076	0.162	0.077
error	297.640	25	11.906			
Total	238747	28				
Modified total	1202.679	27				
	Mean square = 0.753				Adjusted mean square = 0.733	

Table 4. The output of the covariance test for the effectiveness of mindfulness-based training on women's public health

Source	sum of squares	Degrees of freedom	average of squares	F	Significance level	effect value (Partial Eta Squared)
Modified model	2458.978	2	1234.489	145.561	0.000	0.921
y-intercept	2.015	1	2.015	0.238	0.000	0.528
Mindfulness-based training	2219.943	1	2219.943	261.758	0.000	0.913
Pre-test family cohesion	236.835	1	236.835	27.926	0.630	0.009
error	212.022	25	8.481			
Total	20888.0	28				
Modified total	2681.0	27				
	Mean square = 0.921				Adjusted mean square = 0.915	

In the first row of this table, there is the modified model of the test, which shows the estimation of the sum of squared errors without considering the value of y-intercept (μ). It seems that a suitable model has been obtained with the small significance level (p value). On the other hand, if we do not consider the value of y-intercept to be zero, the factor of training based on mindfulness has had a significant effect on the mean of variable of public health women with the value of $p = 0.000 < 0.05$. The effect value for each of these variables can be seen in the column at the end of the table in the covariance analysis model. The higher the value of this column for each row, the greater its effect on the dependent variable. Based on this, it can be seen that training based on mindfulness has had an effect on women's public health by 0.913.

In the following table, the results of the covariance test are presented in relation to the effects of the factor variable on the public health variable of men.

In the first row of this table, there is the modified model of the test, which shows the estimation of the sum of squared errors without considering the value of y-intercept (μ). It seems that a suitable model has been obtained with the small significance level (p value). On the other hand, if we do not consider the value of y-intercept to be zero, the factor of training based on mindfulness has had a significant effect on the mean of variable of public health men with the value of $p = 0.000 < 0.05$. The effect value for each of these variables can be seen in the column at the end of the table in the covariance analysis model. The higher the value of this column for each row, the greater its effect on the dependent variable. Based on this, it can be seen that the training based on mindfulness had an effect of 0.484 on the public health of men.

Table 5. The output of the covariance test for the effectiveness of mindfulness-based training on men's public health

Source	sum of squares	Degrees of freedom	average of squares	F	Significance level	effect value (Partial Eta Squared)
Modified model	804.934	2	402.467	16.582	0.000	0.570
y-intercept	71.750	1	71.750	2.956	0.003	0.106
Mindfulness-based training	569.124	1	569.124	23.449	0.000	0.484
Pre-test family cohesion	255.791	1	255.791	10.539	0.098	0.297
error	606.781	25	24.271			
Total	29574.0	28				
Modified total	1411.714	27				
	Mean square = 0.570				Adjusted mean square = 0.536	

6. DISCUSSION AND CONCLUSION

The study aimed to determine the effectiveness of mindfulness-based training on family cohesion and public health for parents of children with special learning disabilities. The findings suggest that mindfulness-based training has a significant therapeutic effect on public health and family cohesion among parents of children with special learning disabilities. These results are consistent with previous studies. Hoshyar et al. (2018) demonstrated through empirical studies the efficacy of mindfulness practice on enhancing quality of life and coping abilities [32]. Similarly, Jeffrey & Gresson (2009) have shown that mindfulness training is associated with increased meaning and inner peace, as well as greater harmony in interpersonal relationships [33]. Supporting these findings, Soroush Vala's (2020) research shows the effectiveness of mindfulness-based interventions on marital satisfaction and coping mechanisms [34]. Furthermore, Whitingham (2013) observed the efficacy of mindfulness for parents of children with disabilities. Esmaili et al. (2015) verified the impact of this approach on the mental well-being of mothers with children who have learning disabilities [35]. Shirazi Tehrani and Gholamrezaei (2015) discovered that mindfulness training produces beneficial outcomes for public health [36].

Enhancing mindfulness leads to increased relaxation and positively impacts cognition, emotions, biology, and behavior, improving overall health. Cultivating these attitudes strengthens mindfulness in individuals, promoting their well-being. Mindfulness-based attitudes, including curiosity, kindness, gratitude, forgiveness, acceptance, non-judgment, patience, humor, trust, and a beginner's mind, contribute to this process.

Teaching mindfulness skills to parents can aid in promoting their children's mindfulness abilities. As such, training parents on mindfulness skills has considerable potential to positively impact family dynamics and child behavior. This is especially important considering the hereditary aspect of attention and impulsivity issues. Additionally, research has shown that parental inattention to children's public behavior can trigger oppositional behavior patterns in the child, which may be aggravated by negative parental attention. Insufficient parental attention to the public behavior of children initiates repetitive patterns of opposing behavior in children, which in turn draw negative attention from parents. Parents can intervene in this coercive pattern by directly reducing the child's opposition or indirectly reducing negative behavior through a decrease in negative responses. Parents can intervene in their child's compulsive behavior by directly reducing their opposition or indirectly reducing negative behavior through minimizing negative responses. Additionally, mindfulness training enables conscious parents to become effective components in managing children with external disorders. Parental acceptance plays a crucial role in improving family adaptation to their children's problems.

In essence, mindfulness training teaches us to relate to events without subjective evaluations. Subsequently, our physical reaction to stress decreases. Mindfulness promotes living in the present moment, impartially. Based on this, offering additional workshops and webinars focused on mindfulness training and being present in the moment for parents of children with special learning disabilities, along with communicating research results to medical centers and clinics to encourage the holding of mindfulness classes for parents of children with special needs and providing

informational resources to parents of special children, can potentially enhance the overall health and quality of life for these parents.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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