



Original Article

The Effects of Maternal Yoga and Self-compassion Exercises on Behavioral Disorders and Depression of Disabled Children

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ARTICLE INFO

Article History:

Received: 08/09/2020

Revised: 13/02/2021

Accepted: 27/06/2021

Keywords:

Yoga

Psychotherapy

Disabled children

Behavioral disorders

Depression

Please cite this article as:

Lotfi Jebeli A, Meshkati Z. The Effects of Maternal Yoga and Self-compassion Exercises on Behavioral Disorders and Depression of Disabled Children. JRSR. 2021;8(2):79-85.

ABSTRACT

Background: The purpose of the present study was to compare the effects of maternal yoga and self-compassion exercises on behavioral disorders and depression of children with disabilities.

Methods: This applied research is a quasi-experimental study with pre-test-post-test control group design. The participants of the current research consisted of 40 cases of mothers (with an average age of 29 years) of disabled children aged 6-18, who were selected using convenience sampling method from Welfare Centers in Isfahan city, and were matched into three experimental groups, and one control group based on depression scores. In order to assess the behavioral disorders and depression in children with disabilities, Child Behavior Checklist (CBCL, Achenbach) and Children Depression Inventory (CDI, Maria Kovacs) were used, respectively. Data were analyzed using univariate and multivariate analysis of covariance at a significance level of $\alpha \leq 0.05$.

Results: The obtained results showed that the pre-test scores of behavioral disorders have a significant relationship with its post-test. When this relationship was controlled, the difference between adjusted means of behavioral disorders scores in the post-test stage in intervention groups was significant. Additionally, no significant relationship was observed between the pre-test and post-test scores of depression, but the difference between adjusted means of depression scores in the post-test stage (after controlling pre-test scores) in intervention group was significant.

Conclusion: Practicing yoga and self-compassion exercises by mothers can cause a reduction in behavioral disorders and depression in children with disabilities. These results show that the family of disabled children, welfare organization, exceptional schools and rehabilitation centers can consider paying attention to parental mental health.

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Introduction

Children with disabilities are at risk for depression and anxiety disorders. The prevalence of depression or anxiety problems among children with disabilities is 35.4% [1]. Depression is manifested as a syndrome or disorder that embraces a series of characteristics, such as specific mood swings, negative self-concept together

with self-blame and self-punishing desires [2]. Anxiety and depression were found to be manifested as behavioral disorders, such as attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and isolated behaviors in particular [3]. Mental health of children with disabilities is affected by the parents' mental health, especially mothers' [4]. A study on American families indicated that children of depressed mothers (20%) show more behavioral problems in the physiological, emotional, social, and cognitive areas than children of non-depressed mothers (6%) [5]. Disabled

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children can have profound effects on the family, and as behaviors resulting from disability are constant and stable, they affect the parent-child interactions [6]. Due to being highly dependent on their parents and because of their physical and mental immaturity, the only thing these children do in the face of stress and discomfort is showing behavioral problems. In fact, the child's behavior is his illustrative language. The more problems the children have with others and with expressing their feelings and needs, the more behavioral and mental disorders they demonstrate [7]. Research studies related to the effects of the disabled child's presence in the family reveal that mothers of children with disabilities have experienced stress and mental crises, and the existence of the disabled child has threatened their compromise and physical and mental health, which often affects them negatively [6]. The negative effects of having a disabled child cause tension and pressure in family members, especially the mother, because the mother is the first person who communicates directly with the child [8]. In some cases, it is observed that some parents consider having a disabled child a divine punishment or test [9]. Parents of children with disabilities show higher levels of coping problems and more conflict than other parents, leading to an increase in the child's behavioral problems over time [10]. The experience of living with a depressed mother puts the children at risk for many psychological disorders, behavioral disorders, academic achievement, and social skills problems. They are at risk for many emotional and behavioral disorders [11]. Family therapy for families with difficult children was found to be essential to reduce children's behavioral disorders [6]. One way to reduce the problems of people in dealing with the psychological pressures of life is to engage in sports activities. Yoga is a "physical-mental" sport whose exercises are based on the awareness of body and mind and their integration. Research has shown that people can create a positive attitude toward life by doing light and continuous yoga exercises. Life force is enhanced through yoga which includes exercises that meet the physiological needs of mothers toward coordination of soul and body [12]. Moreover, yoga is used for therapeutic and clinical interventions and to reduce mental problems and pain caused by clinical diseases [12, 13]. A study by Harrison et al. showed that yoga provides valuable opportunities to parents of hyperactive children to interact with their children, helps with the socialization process, and has positive effects on their cognitive and emotional functioning [14]. However, these effects on the mothers of children with disabilities have not been proven yet.

Another way that may help mothers in this area is psychological interventions. Psychological interventions have been found to affect the symptoms of depression and mental well-being [15]. In a research study, Bazzano et al. found mindfulness training effective in reducing stress and increasing the well-being of mothers of children with developmental disabilities [15]. Self-compassion as a psychological intervention can help improve the individuals' mental health and quality of life. Self-compassion entails the expansion of affection, love, and tangible experience pain and

suffering. It is associated with mindfulness and has three components: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. The first component requires being warm and kind towards the self rather than judging it harshly. The second component refers to accepting life problems as part of the human shared experiences, i.e., problems do not occur only for specific individuals. The third component is the awareness of painful thoughts and emotions instead of being completely immersed in them. Thus, a negative emotion turns into a positive emotion [16]. Robinson et al.'s study showed that the higher the level of self-compassion in mothers, the lower the level of stress, anxiety and depression in their young children [17]. Moreover, other studies have shown that there is a significant relationship between self-compassion, mental health, depression, anxiety, stress, self-absorption, happiness and life satisfaction [15, 16]. Considering the increased level of mother's parenting stress regarding the disabled children, the unfavorable family condition may exacerbate the behavioral problems of disabled children. On the other hand, due to the importance of family and home environment for children's behavioral development, supportive and enrichment experiences at home can help reduce the behavioral problems in children with disabilities [10]. In a few studies, the effects of exercise and psychological interventions on the promotion of mothers' mental health, and subsequently, mental and behavioral health of their disabled children have been investigated separately, but conducting research with different samples and combined groups seems necessary to complete the findings. Therefore, this study aimed to compare the effect of yoga exercises and mothers' self-compassion on behavioral disorders and depression in children with disabilities. For this purpose, the present study seeks to answer the following questions: Do yoga as a physical-mental intervention, self-compassion training as a mental intervention, and a combination of both interventions for mothers improve behavioral disorders and depression in disabled children? Which of the above-mentioned interventions has the greatest influence on behavioral disorders and depression in children with disabilities?

Methods

Subjects

This applied research is a quasi-experimental study with pre-test-post-test control group design. The participants consisted of 40 mothers of 6-18-year old disabled children in Isfahan welfare centers who were selected using a convenience sampling method. The children's disabilities included disability, cerebral palsy, visual impairment, mental retardation, and generally different.

Procedure

The present article is taken from a master's thesis of motor behavior Isfahan (Khorasgan) branch, Islamic Azad University with ethic code number IR.IAU.KHUISF.REC.1398.045. After obtaining a license from the Welfare Organization of Isfahan Province, the

researchers referred to the Welfare and Rehabilitation Centers of Isfahan with a letter of introduction, and held a meeting with the parents of the disabled children aged 6-18 in coordination with the managers of these centers. They explained the objectives of the research and all the steps of the study to the parents, and the mothers of the disabled children were asked to cooperate. The mothers who were willing to attend the training sessions signed the informed written consent to participate in the study after being fully justified, and entered the study. Based on the pre-test scores of depression, the participants were matched in three experimental groups and one control group (10 people in each group). Depression scores were sorted from high to low in a table, and people appeared in the four groups in order from top to bottom. The first experimental group was given 24 60-minute sessions (eight weeks, three sessions per week) of yoga exercises, the second experimental group received 8 90-minute sessions (eight weeks, one session per week) of self-compassion training, and the third experimental group was given a combination of yoga and self-compassion exercises together (the same as the first and second experimental groups). The control group received no sport exercises or psychological interventions during this period. Before and after practicing yoga and self-compassion exercises, all mothers were asked to complete the questionnaires related to their children.

Physical-motor disorders of varying severity.

Data Collection

In this study, the Achenbach Behavioral Inventory and the Maria Kovacs Depression Inventory were used to assess the behavioral disorders and depression in children with disabilities, respectively.

The Child Behavior Checklist (CBCL): The Achenbach child behavioral problems inventory was invented in 1979 to measure behavioral disorders and adaptation of the environment for 6-18-year old children and adolescents. This test contains 113 questions scored from zero to 2 (0= the behaviors and states are absent, 1= the behaviors and states occur sometimes, 2= the behaviors and states occur often or always). The test is made up of 8 sub-scales: seclusiveness, somatic complaints, anxiety/depression, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. In the scales for internalized and externalized behavioral problems and general problems, the person's T-score less than 60 is in the normal or non-clinical range, the T-score between 60-63 is in the borderline-clinical range, and the T-score greater than 63 is in the clinical range. This questionnaire has acceptable validity and reliability and has been normalized to assess the behavioral scales of Iranian children. The internal consistency coefficients of the scales range from 0.63 to 0.95. The temporal stability of the scales was examined using the test-retest method within a time interval of 5-8 weeks and the temporal stability coefficients ranged from 0.32 to 0.67. The agreement between the respondents was also examined. These coefficients ranged from 0.09 to 0.67. Considering validity, various analyses have been carried out, including internal correlation of scales of each form, item-total

correlation, group differentiation, differentiation power, and factor analysis. Overall, the obtained results revealed the high reliability and validity of this tool [18]. In this research, the reliability of the instrument was obtained 0.77 using Cronbach's alpha.

Maria Kovacs Depression Inventory: CDI is a 27-item instrument to assess depression symptoms in children and adolescents 7-16 years. It includes 5 sub-scales: negative mood, interpersonal problems, anhedonia, low self-esteem, ineffectiveness. Items are scored from zero (lack of symptoms) to (existence of certain symptoms). The total score ranges from zero to 54. The higher the person's score, the greater the depression severity. This score is obtained by summing all items [19]. The concurrent validity and internal consistency coefficient of this scale was reported to be appropriate and 0.88, respectively. The test-retest reliability coefficient of this scale was reported 0.81, split-half 0.83, and internal stability 0.88 [20]. In this research, the reliability of the instrument was calculated at 0.79 using Cronbach's alpha.

Training Protocols

-Yoga exercises were performed by an experienced yoga instructor. In all sessions, the first 10 minutes were assigned to general warm-up (pawanmuktasana), 40 minutes to the main body of the exercise (asana: basic movements) and the last 10 minutes to cool down (shavasana: Corpse Pose, one of the yoga asanas for mental and physical relaxation). The main exercises, including stretching, flexibility, calisthenics, strength, balance and meditation, breathing techniques, exercises to boost mental power and self-awareness, and self-improvement and stress relaxation were performed [21].

-Self-compassion exercises were performed to promote mental health and quality of life and to spread love and affection toward self and others by relying on the following: creating motivation to take care of self and others; reducing pain and helping growth and prosperity; creating sensitivity to the feelings and needs of self and others; creating sympathy, emotional desire and coordination with emotions, distress, and the need to grow; developing the ability to tolerate (rather than avoid) emotions, memories or difficult situations; creating insights and understanding how the mind works; creating an orientation with acceptance; not blaming, and disobedient to self and others [22].

Statistical Analysis

The obtained data were analyzed using univariate and multivariate analyses of covariance in SPSS 23 software.

Results

Table 1 shows the mean and standard deviation of the research variables by research groups in two research steps.

There are some initial assumptions that underlie the use of parametric tests such as analysis of covariance (ANCOVA), including the normality of scores, equality of variances and homogeneity of regression slope. In

Table 1: Mean and standard deviation scores of research variables by groups in two research steps

Variable	Group	Pre-test		Post-test	
		Mean	Standard deviation	Mean	Standard deviation
Behavioral disorders	Yoga and self-compassion	38.50	14.97	31.20	18.07
	Self-compassion	42.60	20.47	41.30	14.43
	Yoga	65.30	26.57	39.40	25.44
	Control	50.30	12.50	49.70	12.33
Depression	Yoga and self-compassion	21.70	3.59	10.70	6.16
	Self-compassion	24.30	2.90	11.80	4.52
	Yoga	25.60	6.48	14.50	9.28
	Control	22.90	3.41	22.10	3.70

Table 2: Results of ANCOVA for comparing the mean scores of research variables based on group membership

Variable	Sources of variation	Sum of squares	Degree of freedom	Mean of squares	F	Significance	Effect size	Statistical power
Behavioral problems	Pre-test	4229.806	1	4229.806	19.028	0.001	0.352	0.989
	Group membership	1945.491	3	648.497	2.917	0.048	0.2	0.744
	Error	7780.394	35	222.297				
	Sum	79026	40					
Depression	Pre-test	9.522	1	9.522	0.236	0.63	0.007	0.076
	Group membership	792.912	3	264.304	6.544	0.001	0.359	0.954
	Error	1413.578	35	40.388				
	Sum	10947	40					

case of unequal and less than 40 group sizes, these tests can be used by observing and verifying assumptions.

The results of Kolmogorov-Smirnov test for the scores of research variables showed that the null hypothesis that the scores distribution in the research variables is normal in all groups was supported ($P > 0.05$). The results of the Levin test to examine the presumption of the equality of variances showed $\text{sig} = 0.053$ and $F = 2.81$ in the post-test stage for the behavioral disorders variable and for the depression variable $\text{sig} = 0.051$ and $F = 2.9$. Overall, the results reveal that the presumption of the equality of variances in the post-test has been supported in all research variables ($P > 0.05$). Additionally, the group-pre-test interaction in terms of post-test showed the behavioral disorders variable with $\text{sig} = 0.586$ and $F = 0.655$ and in the depression variable $\text{sig} = 0.164$ and $F = 1.817$, which were non-significant, indicating the homogeneity of regression slopes. By observing the assumptions, the ANCOVA can be used to analyze the findings. Results of ANCOVA for comparing the post-test scores of three experimental groups and one control group are presented in Table 2. To control the effect of pre-test administration on the post-test scores in this analysis, pre-test scores were controlled and the groups were then compared according to the remaining scores.

As shown in Table 2, the pretest scores of behavioral disorders have a significant relationship with those of the post-test ($P < 0.05$). By controlling this relationship, the difference between the post-test adjusted mean scores of behavioral disorders (after controlling the pre-test scores) is significant in the intervention groups ($P = 0.048$). The results have shown that about 0.2 or 20% of personal differences in behavioral disorders is related to the difference between the four groups or the effect of training interventions. Additionally, no significant relationship was observed between the pre-test and post-test scores of depression ($P > 0.05$), but the difference between the post-test adjusted mean scores of depression (after controlling

the pre-test scores) is significant in intervention groups ($P = 0.001$). The obtained results have shown that about 0.359 or 35.95 % of personal differences in depression are related to the difference between the four groups or the effect of training interventions. The statistical power of more than 70% in behavioral disorders and more than 90% in depression indicates that the statistical accuracy of these tests is desirable; moreover, it shows the adequacy of the sample size to test these hypotheses.

Considering the significance of the difference between groups in post-test stage of the research variables behavioral disorders and depression, the comparison of mean scores of variables in four groups is shown in Table 3.

The results represented in Table 3 show that the pre-test effect of behavioral disorders on the post-test is significant ($P < 0.05$). By controlling this effect, the results show that there is a significant difference in behavioral disorders in the pre-test stage between the yoga training group and the control ($P < 0.05$), and the difference between self-compassion group and self-compassion combined with yoga group, and the control is not significant ($P > 0.05$). These results show that the effect of yoga training on improving the behavioral disorders of disabled children is equal to 17.2%, which is significant, while the effect of self-compassion training and yoga combined with self-compassion on improving this variable is 1% and 8%, respectively. These values are small and non-significant. But the difference in the post-test mean scores of behavioral disorders is not significant between the combined yoga and self-compassion group and yoga group and self-compassion group ($P > 0.05$). Moreover, no significant difference was observed between yoga group and self-compassion group ($P > 0.05$). In a general conclusion, it seems that only yoga training to mothers can reduce behavioral problems in children with disabilities. The results displayed in Table 3 show that the pre-test effect of depression on post-test is not significant ($P > 0.05$); by controlling this effect, the post-test results

Table 3: Results of estimating parameters by research variables in post-test stage or comparing the mean scores of four groups in research variables

	Parameter	B	Standard deviation	t	Significance	Effect size	Statistical power
Behavioral disorders	Pre-test	0.599	0.128	4.36	0.001	0.352	0.989
	Comparing yoga and self-compassion group with control	-11.907	6.837	-1.74	0.09	0.08	0.395
	Comparing self-compassion training group with control	-4.98	6.74	-0.608	0.547	0.01	0.091
	Comparing yoga group with control	-18.68	6.94	-2.692	0.011	0.172	0.745
	Comparing yoga and self-compassion group with self-compassion	7.809	6.686	1.168	0.251	0.037	0.206
	Comparing yoga and self-compassion group with yoga group	-6.773	7.499	-0.903	0.373	0.023	0.142
	Comparing self-compassion group with yoga	-14.582	7.274	-2.005	0.053	0.103	0.496
Depression	Pre-test	-0.119	0.245	-0.486	0.63	0.007	0.076
	Comparing self-compassion training group with control	-11.542	2.857	-4.40	0.001	0.318	0.975
	Comparing self-compassion training group with control	-10.134	2.863	-3.54	0.001	0.264	0.931
	Comparing yoga group with control	-7.279	2.918	-2.49	0.017	0.151	0.679
	Comparing yoga and self-compassion group with self-compassion	1.409	2.912	0.484	0.632	0.007	0.076
	Comparing yoga and self-compassion group with yoga	4.263	2.99	1.422	0.164	0.055	0.282
	Comparing self-compassion group with yoga	2.854	2.86	0.998	0.325	0.028	0.163

show a significant difference in depression between the compassion training group and the control ($P < 0.05$), the yoga group and the control ($P < 0.05$), and the combined self-companion and yoga and the control ($P < 0.05$). It is indicated that the effect of self-compassion training to mothers on depression improvement for children with disabilities is equal to 26.4%, the effect of yoga training to mothers on depression improvement for children with disabilities is equal to 15.1%, and the effect of combined yoga and self-compassion training to mothers on improving this variable is 31.8%. All these values are significant. But the difference in the post-test mean scores of depression is not significant between the combined yoga and self-compassion training group, and the yoga group and self-compassion group ($P > 0.05$). No significant difference was observed between the yoga group and the self-compassion group. In a general conclusion, it seems that self-compassion training and yoga training and the combination of them can improve depression in children, but there is no significant difference between these three interventions.

Discussion

Family is a network of connections in which parents and children interact mutually. Interactions between members have a significant effect on increasing or decreasing problems. Children are greatly influenced by the family environment and factors affecting it; therefore, treating children's disorders is impossible without considering the individuals affecting the child [23]. The results of the present study showed that practicing yoga by mothers has a significant effect on reducing behavioral disorders and depression in children with disabilities. Findings of the present study agree with those obtained by Barkly [24], Agazzi et al. [25], and West et al. [13]. In explaining the effect of practicing yoga by mothers on reducing behavioral disorders and depression in children, it should

be said that enhanced parental skills reduce anxiety, depression and stress in mothers, and alleviate behavioral problems in children [25, 26]. Mothers of children with disabilities are at risk for poor mental health compared to mothers of children who grow up normally. Nearly half (48%) of these mothers have severe-extreme depression. Providing support to mothers at the time of diagnosis and therapeutic intervention is the most important issue for their child [27]. Yoga is made up of exercises that meet the physiological needs of mothers toward stretching muscles and increasing the range of motion of the joints, as well as relaxing the muscles to coordinate the soul and body [24]. Such exercises reduce the activity of the autonomic central nervous system in stressful circumstances, which dramatically reduces the activity of the sympathetic nervous system and improves the individual's relaxation in different circumstances [23]. This exercise has also been employed for treatment and clinical interventions and to decrease mental problems and pain caused by clinical diseases [12, 13]. Research studies have shown that yoga exercises provide parents with valuable opportunities to interact with their children and help with the socialization process and positively affect their cognitive and emotional functioning [14]. Moreover, researchers believe that yoga with a mindfulness-based approach has a good effectiveness in treating anxiety and depression. In this vein, Capon et al. state that yoga exercises are a self-management tool for mental health that is available as prevention strategies [28].

Another finding of the present study indicated that self-compassion training to mothers significantly reduced depression in children with disabilities. Accordingly, Ridderinkhof et al. [29], Floyd et al. [30], Robinson et al. [17] and Bazzano et al. [15] found mindfulness training and the increased self-compassion to be effective in reducing stress and increasing the well-being of mothers with developmental disabilities. In explaining these findings, it should be said that self-compassion has a close

relationship with mindfulness. Living in the moment and being aware of the situation without judging rather than avoiding it is an integral part of self-compassion. Moreover, self-compassion and self-forgiveness take the place of self-critique. Self-compassion to mothers seems to help mothers to better deal with challenges and acts as a protective shield between the problem perception and psychological conflict [17]. Self-compassion entails proper coping resources that help people encounter the negative events of their lives. Additionally, they aid people to act more adaptively and more regularly in the face of stressful life events by applying learning experiences [16]. This support can help mothers not to consider their children as a burden or a divine test and to adjust this insight [9]. Karaman and Efiltili believes that by increasing the level of self-compassion in parents, the general level of psychological resilience is improved [31]. Boosting social communication, emotional functioning, behavioral functioning, and mental awareness of the mother lead to the reduction of aggressive and contradictory behaviors of children and adolescents, elevate compliance with the mother's demands. It can be said that these characteristics can lead to the optimization of the mother-child relationship and pave the way for establishing an effective mother-child relationship and provide a safe nurturing family environment for children [26]. Improving the mental health in mothers assist them to use a lifestyle redesign strategy that is compatible with the disabled child [4]. Undoubtedly, the cares and positive relationships of mothers with desirable psychological well-being with their children contribute to higher level of mental health of their children and reduce their depression [26]. Additionally, all three interventions of yoga, self-compassion and the yoga combined with self-compassion reduced the level of depression in children, which did not differ significantly between the groups. To explain, the mechanism of influence of both methods (yoga and self-compassion) is probably the same. Self-compassion is associated with improvement in emotion regulation, level of anxiety, depression, and overall mental relaxation. Self-compassion has been able thus to act as a protective factor [32]. On the other hand, yoga uses mindfulness techniques to alter a person's relationship with their thoughts and while reducing critical thoughts about self, produces affective kindness [33]. In light of the above, the mechanism of influence in both methods is the regulation of emotions through the person's awareness and mastery over his mind.

Considering the limited time conditions, conducting a follow-up test to observe the effectiveness of yoga and self-compassion exercises was impossible in the long term. Moreover, due to limited access to individuals, the research statistical population consisted of only mothers who referred to welfare centers in Isfahan and agreed to participate in this study. Selecting the sample from only one city and socio-economic area of the society can also be considered a threat to the external validity of the results.

Considering the findings of the present research, it is suggested that more variables, such as life quality, resilience, and mental health in the subjects be

investigated in future research. Moreover, it is suggested that sampling be performed in other cities. As the follow-up was not possible due to time constraints, studies with long-term follow-up and longitudinal studies are also suggested.

Conclusion

Generally, it is of paramount importance to pay attention to the physical and psychological characteristics of mothers with disabled children. Considering the results of the present study and other consistent studies, it can be said that yoga exercises and self-compassion training to mothers are complementary methods to alleviate the problems of children with disabilities.

Acknowledgments

The researchers would like to appreciate the cooperation of all the officials and mothers who participated in this research in the centers of Tavakol, Asodeh-Mava and Behesht-e-koodak.

Funds

There was no external financial support for this study.

Conflict of Interest: None declared.

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