

# Effectiveness of Group Stress Reduction on Mental Health, Mothers' Quality of Life, and Behavioral Problems in Children with Attention Deficit Hyperactivity Disorder

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## Abstract

**Background:** Children with attention deficit hyperactivity disorder (ADHD) run a high risk of behavioral problems. Their parents are also at risk of mental health and reduced quality of life. The present study aimed to investigate the effect of group mindfulness-based stress reduction on the parents of ADHD children and their mental health, quality of life, and behavioral problems.

**Methods:** We conducted this single-blind randomized controlled clinical trial on 76 mothers with ADHD children aged 8-16 years referred to the clinics affiliated to Shiraz University of Medical Sciences. We randomly divided the patients into intervention and control groups. Group therapy included eight 45-minute sessions in two months and a three-month follow-up. The employed instruments were Strengths and Difficulties Questionnaire-parent form (SDQ-P), General Health Questionnaire-28 (GHQ-28), and Health related quality of life-short form-36 (HRQOL-SF-36). We analyzed all data by SPSS, and P values less than 0.05 were statistically significant.

**Results:** After the intervention, the overall mean score for GHQ-28 ( $P<0.01$ ) and dimensions of HRQOL-SF-36 ( $P<0.01$ ), physical ( $P<0.001$ ), and mental health significantly increased ( $P<0.01$ ) and SDQ-P decreased ( $P<0.01$ ) in the intervention group compared to the control group.

**Conclusion:** Group mindfulness-based stress reduction was effective on mental health and quality of life in the parents of children with ADHD and could decrease child behavioral problems.

**Keywords:** Attention deficit hyperactivity disorder, Mindfulness, Mental health, Quality of life, Behavioral problem

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## 1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type described by symptoms of inattention, hyperactivity, and/or impulsivity (1). Children with ADHD, particularly if they have conduct problems, are at risk of adverse outcomes (2, 3).

Having a child with a disorder or disability is often considered as a stressful factor for the family. This condition can disturb family and marital functioning and parent-child relationships; it may further lead to high parental expressed emotion, more negative and conflicting communications, reduced parenting self-efficacy and quality of life, increased levels of parenting stress, maternal psychological stress, and parental psychopathology. Since mothers interact more with their children, they are likely to be the most affected (4-8).

nonjudgmental attention towards one's experiences in the present moment (9). MBI is useful in adults who suffer from stress, depression, pain, and illness (10, 11).

Mindfulness-based stress reduction was used as a complementary treatment to the traditional therapeutic strategies for different medical and psychiatric conditions (12), such as chronic diseases, depression, and anxiety (13-19). It was also used as a health promotion and disease prevention intervention in healthy individuals, indicating benefits in physical and psychological health (20).

Mothers of ADHD children had more stress and less mental health compared with the controls (21); also, there was a significant negative correlation between children's behavioral problems and the mental health of their mothers (22).

The results of several studies revealed that mindfulness-based intervention was effective in

Mindfulness-based intervention (MBI) is a

reducing marital stress of mothers with ADHD and increasing their mental health (23, 24); it further increased the psychological well-being of mothers of children with learning disabilities (25), and reduced the behavioral problems of children suffering from ADHD (26, 27). MBI also effectively addressed parental stress and family functioning (23). Mindfulness-based reduced parenting stress, improved family functioning (28, 29), and increased child compliance and satisfaction among parents regarding interaction with children (30).

Epidemiological studies reported 3 to 7% ADHD prevalence in American schools whereas this prevalence was 10.1% in Shiraz (6). Therefore, it is necessary to implement a method to improve the condition of mothers. We conducted the present study to investigate the effectiveness of group mindfulness-based stress reduction on mental health, quality of life, and behavioral problems in the parents of children with ADHD.

## 2. Methods

This single-blind randomized controlled clinical

trial comprised 76 mothers with ADHD children aged 8-16 years referred to the clinics affiliated to Shiraz University of Medical Sciences (SUMS). We collected the data in the spring of 2017. Patients meeting the inclusion criteria were selected.

Inclusion criteria were 1) minimum elementary education (sixth grade), 2) willingness to participate in the research, 3) having a child with ADHD according to a psychiatrist's diagnosis, and 4) at least three years of ADHD diagnosis. The exclusion criteria were the mother or child having a psychiatric disabling problem or other medical chronic illnesses. We explained the objectives of the study to the participants, and they signed a written informed consent. After that, we divided the subjects into two groups of 32. The intervention group received group mindfulness-based stress reduction while the control group received no intervention. The determined sample size was 18 (nine individuals per group), based on the data from a study conducted in Iran in 2017 (24) and considering a type I error of 0.05.

Eventually, based on block randomization, a total of 64 individuals (32 per group) participated in our

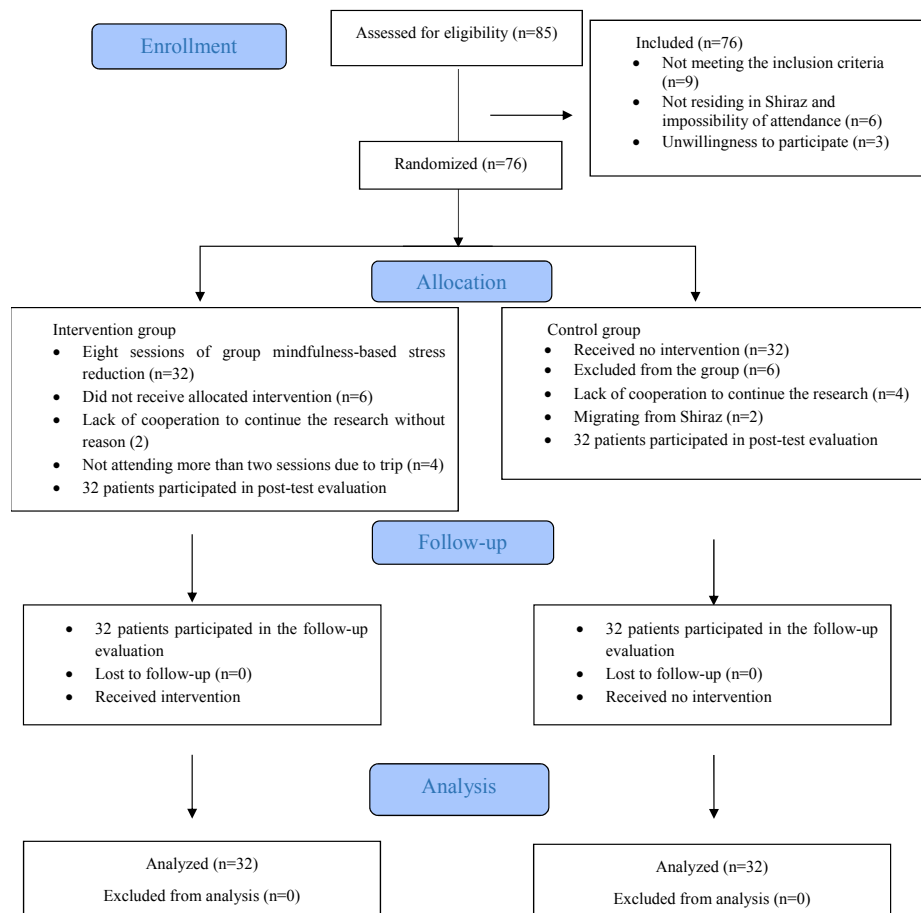


Figure 1: Consort flowchart of study population

study. Consort flowchart shows the study participants (Figure 1).

After obtaining approval from the local ethics committee (IR.SUMS.MED.REC.1394.76) and the authorities, we selected 76 patients through convenient sampling. We assured the patients of the confidentiality of their information and the right to withdraw from the study at any time during the course of the research. Numerical codes and general data were used to maintain anonymity. Instruments included:

### 2.1. Demographic questionnaire

It collected information regarding age and education level.

### 2.2. SDQ-P

The SDQ consists of 25 items which assess a range of 'strengths' and 'difficulties' as behavioral markers of potential mental health problems. The items contribute to five subscales of five items, each with a minimum score of 0 (lowest score) to 10 (highest score): conduct problems, hyperactivity/inattention, emotional symptoms, peer problems, and prosocial behavior. The sum of the first four subscales generates a total difficulty score ranging from 0 to 40. Cut-off scores for clinical cut-off point can be generated according to the total difficulties and subscale scores (31). Internal reliability was shown to be excellent (Cronbach's  $\alpha$  0.79); The validity was also found to be satisfactory based on confirmatory factor analysis (RMSEA=0.02) (32-34). Reliability by internal consistency (0.66-0.84) and validity were also found to be satisfactory through the correlation method between parents and teachers ( $r=0.43$ ,  $P<0.01$ ) in Iran (35).

### 2.3. GHQ-28

The GHQ-28 was created by Goldberg in 1978. Developed as a screening tool to detect those likely to have or to be at risk of developing psychiatric disorders, the GHQ-28 is a 28-item measure of emotional distress in medical settings. The GHQ-28 is divided into four subscales based on factor analysis: somatic symptoms (items 1-7), anxiety/insomnia (items 8-14), social dysfunction (items 15-21), and severe depression (items 22-28). Numerous studies investigated the reliability and validity of the GHQ-28 in various clinical populations. Internal reliability was shown to be excellent (Cronbach's  $\alpha=0.9-0.95$ ) (36). GHQ-28 correlated well with the longer form of the scale

( $r=0.97$ ), Hospital Depression, and Anxiety Scale (HADS) (37). Reliability by internal consistency (0.91) and the cut-off point were 22 in an Iranian sample, and it correlated well with MHQ ( $r=0.55$ ) (38).

### 2.4. HRQOL-SF-36

The short form 36-item (SF-36) is a good standard instrument for assessment in HRQOL. The SF-36 questionnaire consists of eight scales yielding two summary measures, namely physical and mental health. The physical health measure is comprised of four scales of physical functioning (10 items), role-physical (four items), bodily pain (two items), and general health (five items). The mental health measure includes vitality (four items), social functioning (two items), role-emotional (three items), and mental health (five items). Answers to the questions scored from 0 (low) to 100 (high). It is a reliable and valid measure in multiple studies. Internal reliability was shown to be excellent (Cronbach's  $\alpha$  0.9-0.95); the validity was also found to be satisfactory based on the correlation between an item; and its scale was at least 0.40 (39). In an Iranian sample, the Cronbach's alpha coefficients varying from 0.77 to 0.90 with the exception of the vitality scale (Cronbach's  $\alpha=0.65$ ) and convergent validity using each item correlation with its hypothesized scale showed satisfactory results (all correlations above 0.40 ranged from 0.58 to 0.95) (40).

After selecting the cases in both groups, the patients in the experimental group participated in eight two-hour group therapy sessions over the course of two months. Meetings were held once a week for 45 minutes. We performed pretest and posttests for the experimental and control groups. The follow-up was also carried out three months after the study. Table 1 summarizes the topics of each session.

We performed all statistical analyses with SPSS version 16 software. In addition, the significance level was  $P<0.05$ . Of note, that data analysis was performed by one individual with no prior knowledge of the two groups' backgrounds.

## 3. Results

All participants were women that had children diagnosed with ADHD; they were living in Shiraz. The mean age of the children in the experimental and control groups was  $8.66\pm 2.51$  and  $9.26\pm 2.53$ , respectively ( $t=0.09$ ,  $P=0.12$ ). The education level of the participants varied from ninth grade to bachelor's degree. All children took methylphenidate (Ritalin).

**Table 1:** Schedule of mindfulness-based stress reduction intervention in eight sessions

| Session Number | Content   |
|----------------|---|
| Session one    | Introducing the members of the group, explaining the research purpose, completing the questionnaires and the consent form, explaining the rules of the group therapy, introducing ADHD, explaining the concept of mindfulness and the use of drug therapy |
| Session two    | Explaining the role of mindfulness, the benefits and methods of mindfulness breathing, mindful attention to the body, listening to music in a mindful way, mindful breathing three times in a day   |
| Session three  | Reviewing the tasks of the previous session, investigating the effect of mindful breathing on stress, group mindful breathing exercises, mindful breathing three times a day  |
| Session four   | Reviewing the tasks of the previous session, methods for dealing with negative emotions, getting rid of negative emotions, eliminating negative emotions at home  |
| Session five   | Reviewing the tasks of the previous session, investigating the effect of mindful breathing again, learning to see the mind, focusing on thoughts and controlling them, performing the session's tasks at home   |
| Session six    | Reviewing the tasks of the previous session, emphasizing drug therapy, explaining the mind's efforts to make negative assessments of different events and how to deal with the negative assessments of the mind and ignore them                           |
| Session seven  | Training therapeutic methods, explaining wise perspectives (the difference between who we are and who we think we are)  |
| Session eight  | A summary of previous sessions, checking mindful breathing, post-test completion, response to client's questions  |

The groups had no significant difference in terms of demographic information, including age and mothers' education level. Also, the children had no significant differences regarding drug dose.

Prior to the intervention, we compared the variables of the study between the two groups and found no significant differences in the pretest; we used independent t test to compare the groups (Table 2).

We also used repeated measures to determine the effectiveness of the intervention conducted in the experimental group compared with the controls. The results showed that the intervention group was more effective than the control group in improving the mental health ( $P=0.01$ ) and quality of life ( $P=0.01$ ) in mothers and reducing behavioral problems ( $P=0.001$ ) in children. Mental health ( $P=0.01$ ) and quality of life ( $P=0.05$ ) increased during treatment in the intervention group. Groups and time levels interacted in terms of mental health ( $P=0.0001$ ) and physical dimension of quality of life ( $P=0.0001$ ) in mothers and behavioral problems ( $P=0.01$ ) in children (Table 3).

#### 4. Discussion

The results of this study revealed that group mindfulness-based stress reduction was effective in improving the mental health, quality of life in mothers, and children's behavioral problems. This change was further observed in the follow-up. Also, parents of the experimental group reported significantly reduced behavioral problems in children at the follow-up stage. These findings were consistent

with some studies (23-30).

In families with children suffering from ADHD, parents experience several types of mental disorders (3, 21, 41, 42). In order to control the mind, it is necessary to properly understand its rules and maximize their capabilities by managing them. Mindfulness is the psychological process of consciously paying attention to the experiences occurring at the present moment. It can also be considered as an enhanced awareness of the current experiences or present reality. Self-awareness refers to individual's consciousness of experiences even if they are not the center of one's attention (11).

When people are aware of their thoughts, emotions, motives, and behaviors, they can better manage them. In this process, the individual concentrates on the present. Living in the present, we see reality with all its external and internal aspects and realize that the mind creates or exacerbates depression, anxiety, and stress due to the judgments it passes and interpretations it makes (13, 43, 44).

In fact, mindfulness is an important underlying factor in achieving emancipation because it is a powerful and effective approach to preventing the pressures of the world or the individual's mental pressures (3, 41, 42).

Increased stress in parents with ADHD children can cause problems in the communication between family members, exacerbating the symptoms of children and increasing their anxiety and depression. The present interventional approach could be regarded as an effective method for improving the quality of life

**Table 2:** Descriptive characteristics of intervention and control group

| Scale        | Variable                  | Group        | mean±SD     | P    |
|--------------|---------------------------|--------------|-------------|------|
| *SDQ-P       | Emotional symptoms        | Intervention | 4.91±2.69   | 0.87 |
|              |                           | Control      | 4.68±2.81   |      |
|              | Conduct problems          | Intervention | 4.34±2.22   | 0.72 |
|              |                           | Control      | 4.09±1.74   |      |
|              | Hyperactivity/inattention | Intervention | 7.55±1.92   | 0.79 |
|              |                           | Control      | 7.68±1.85   |      |
|              | Peer problems             | Intervention | 3.65±1.74   | 0.90 |
|              |                           | Control      | 4.22±1.97   |      |
|              | Prosocial behavior        | Intervention | 6.68±2.58   | 0.85 |
|              |                           | Control      | 6.85±2.22   |      |
| Total        | Intervention              | 20.87±7.27   | 0.94        |      |
|              | Control                   | 20.26±5.11   |             |      |
| *GHQ-28      | Somatic symptoms          | Intervention | 9.34±4.79   | 0.25 |
|              |                           | Control      | 7.76±4.89   |      |
|              | Anxiety/insomnia          | Intervention | 10.17±4.95  | 0.08 |
|              |                           | Control      | 8.0±3.11    |      |
|              | Social dysfunction        | Intervention | 7.86±3.95   | 0.78 |
|              |                           | Control      | 8.18±2.10   |      |
|              | Severe depression         | Intervention | 6.13±5.46   | 0.28 |
|              |                           | Control      | 4.27±4.46   |      |
|              | Total                     | Intervention | 32.46±14.24 | 0.22 |
|              |                           | Control      | 28.28±12.35 |      |
| *HRQOL-SF-36 | Physical health           | Intervention | 48.33±4.63  | 0.21 |
|              |                           | Control      | 48.09±6.11  |      |
|              | Mental health             | Intervention | 41.25±6.88  | 0.23 |
|              |                           | Control      | 41.42±3.99  |      |

\* SDQ-P: Strengths and Difficulties Questionnaire-parent form, GHQ-28: General Health Questionnaire-28, HRQOL-SF-36: Health related quality of life-short form-36

**Table 3:** Comparison of the groups in terms of SDQ-P, GHQ-28, HRQOL-SF-36 at posttest and follow-up

| Variable                       | Group        | Pretest     | Posttest    | Follow up   | P      |       |             |
|--------------------------------|--------------|-------------|-------------|-------------|--------|-------|-------------|
|                                |              |             |             |             | Group  | Time  | Group* time |
| *SDQ-P                         | Intervention | 20.87±7.27  | 20.12±5.16  | 17.87±3.72  | 0.01*  | 0.08  | 0.01*       |
|                                | Control      | 20.26±5.11  | 20.44±5.11  | 20.22±5.11  |        |       |             |
| *GHQ-28                        | Intervention | 32.46±14.24 | 23.86±13.79 | 19.06±12.61 | 0.01*  | 0.01* | 0.0001*     |
|                                | Control      | 28.28±12.35 | 30.57±11.74 | 30.28±12.35 |        |       |             |
| *HRQOL-SF-36 (physical health) | Intervention | 48.33±4.63  | 50.33±2.58  | 51.00±3.68  | 0.001* | 0.05* | 0.0001*     |
|                                | Control      | 48.09±6.11  | 47.49±4.81  | 48.29±4.98  |        |       |             |
| *HRQOL-SF-36 (mental health)   | Intervention | 41.25±6.88  | 40.12±4.22  | 39.75±4.20  | 0.001* | 0.05* | 0.1         |
|                                | Control      | 41.42±3.99  | 41.42±3.99  | 41.32±3.99  |        |       |             |

\* SDQ-P: Strengths and Difficulties Questionnaire-parent form, GHQ-28: General Health Questionnaire-28, HRQOL-SF-36: Health related quality of life-short form-36

and mental health of parents, which also reduces the symptoms of children's illness (45).

Group mindfulness-based stress reduction increases people's awareness and the ability to interpret stressful situations, reducing mental and emotional distresses. The effectiveness of this treatment is based on the patient's automatic thoughts; MBI improves

observation, attention, and concentration, and other necessary skills in mothers. Therefore, it enhances their quality of life and feelings of control over their children's circumstances and increase mother's mental health (46).

This treatment increases selective attention, thereby reducing negative processes such as emotional



vulnerability and increasing the quality of life and mental health (46).

Research has established a link between parenting stress and intensified presence of parental psychopathology (47). Studies on the mothers of ADHD children have shown that increased levels of parenting stress are closely related to the behavioral problems in their children. This fact is supported by a study conducted on school-age children and adolescents. Maternal anxiety was associated with parenting stress, which was increased due to the defiant behavior of children with ADHD symptomatology (1).

Parents improved their relationship using mindfulness techniques in their interactions with their children, particularly during the transition from childhood to adolescence (23). Thus, psychological interventions for stress reduction can decrease children's behavioral issues via improving parental behavior towards children (1).

This study had certain limitations. Firstly, the demographic characteristics were not considered in selecting the cases. Secondly, the gender of the subjects was not considered in the analysis. Thirdly, the number of cases was small, so the results should be generalized with caution. The present intervention is recommended for children diagnosed with ADHD and their fathers and mothers. The long-term effects of treatment can further be investigated, and studies with longer intervals of follow-up can be useful.

## 5. Conclusion

MBI can improve beliefs, parenting practices, positive changes in child behavior, and mindfulness in parenting. It is an effective approach to increasing mental health and the quality of life among mothers with ADHD children.

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## Ethical Approval

The Ethics Review Board of Research Committee of Shiraz University of Medical Sciences, approved the present study with the following number: IR.SUMS.MED.REC.1394.76 written in 2017.

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**Conflicts of interest:** None to declare.

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