Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Complementary Therapies in Clinical Practice 47 (2022) 101566

Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice

journal homepage: www.elsevier.com/locate/ctcp

Effect of the Mindfulness-Based Stress Reduction program on stress, anxiety, and childbirth fear in pregnant women diagnosed with COVID-19

Esra Güney [a], Sıdıka Özlem Cengizhan [b], Esra Karataş Okyay [c,*], Zeynep Bal [a], Tuba Uçar [a]

[a] Department of Midwifery, Faculty of Health Sciences, İnönü University, Malatya, Turkey
[b] Department of Midwifery, Faculty of Health Sciences, Gaziantep Islam Science and University, Gaziantep, Turkey
[c] Department of Midwifery, Faculty of Health Sciences, Kahramanmaraş Sütçü İmam University, Kahramanmaraş, Turkey

ARTICLE INFO

Keywords:
COVID-19
Mindfulness
Perinatal mental health
Pregnancy
Prenatal mood

ABSTRACT

Objective: This study aims to examine the effectiveness of a live online Mindfulness-Based Stress Reduction (MBSR) program in preventing distress, anxiety and childbirth fear in pregnant women diagnosed with COVID-19.

Material and methods: Designed as a randomized-controlled trial, this study was performed with the participation of pregnant women who were diagnosed with COVID-19. The sample comprised 84 pregnant women, including 42 in the experimental group and 42 in the control group. The online MBSR program composed of eight sessions and lasting four weeks was provided to the pregnant women in the experimental group, whereas such an initiative was not provided to the control group. The data were collected via the Revised Prenatal Distress Questionnaire (NuPDQ), the Beck Anxiety Inventory (BAI), and the Childbirth Attitudes Questionnaire (CAQ).

Results: After the MBSR program, the mean NuPDQ, BAI and CAQ scores of the pregnant women in the experimental group were significantly lower than the mean scores of those in the control group ($p < 0.001$).

Conclusion: The online MBSR program may be utilized to reduce the distress, anxiety and childbirth fear levels of pregnant women diagnosed with COVID-19. By using the MBSR program, health professionals might improve the psychological well-being of pregnant women diagnosed with COVID-19.

1. Introduction

The COVID-19 pandemic had intensive effects on healthcare services, social structures, and the world's economy [1]. The negative effects of this pandemic on mothers and perinatal health are not limited solely to the country-wide quarantines, interruptions in health services, and the fear of visiting health institutions. The morbidity and mortality directly caused by the disease may affect the well-being and mental health of pregnant women and their babies [2,3].

The epidemics of newly emerging viral diseases have always given rise to worries among people and societies at risk of infection. This is the case especially for pregnant women who fear most of the time not only for themselves but also for their unborn infants [4]. Pregnant women may feel worried about the isolation imposed on patients diagnosed with COVID-19 and the probability of infecting the fetus with COVID-19; hence, they may be more vulnerable to anxiety [5–7]. In a meta-analysis conducted on COVID-19, it was stated that pregnant women who were evaluated after the onset of the pandemic exhibited significantly higher levels of depressive symptoms than those who were evaluated before the pandemic [2].

Being diagnosed with COVID-19 gives rise to stress, anxiety and even depression in pregnant women and may affect their psycho-social health adversely [8,9]. Constant and high-level prenatal distress, anxiety and depression symptoms increase the rates of prenatal infection and disease, as well as the risk of post-natal depression [10,11]. At the same time, prenatal distress, anxiety and depression may bring about problems in the development of the fetus's motor and cognitive skills besides leading to miscarriage, premature birth, and low birth weight [12,13]. Therefore, in the context of the COVID-19 pandemic, pregnant women's mental health problems are just as important as their physical health and should not be neglected [14].

Studies have shown that Mindfulness-Based Stress Reduction (MBSR) practices could lead to improvements in a variety of psychological and physiological health conditions [15–17]. In the recent period, a

* Corresponding author. Department of Midwifery, Faculty of Health Sciences, Kahramanmaraş Sütçü İmam University, 44280, Malatya, Turkey.
E-mail addresses: esra.guney@inonu.edu.tr (E. Güney), sidika_cengizhan@hotmail.com (S.Ö. Cengizhan), eokyay@ksu.edu.tr (E. Karataş Okyay), zeynepp_ball@hotmail.com (Z. Bal), tuba.ucar@inonu.edu.tr (T. Uçar).

https://doi.org/10.1016/j.ctcp.2022.101566
Received 9 June 2021; Received in revised form 10 January 2022; Accepted 19 February 2022
Available online 23 February 2022

systematic review and meta-analysis of mindfulness-based interventions in pregnancy found that MBSR could be useful for overcoming problems such as anxiety, depression, perceived distress, and increasing mindfulness levels [18]. Likewise, a systematic review of the effect of the MBSR approach on maternal perinatal mental health outcomes presented preliminary evidence for the effectiveness of MBSR in lowering perinatal anxiety. The same systematic review put forward that MBSR could be integrated into existing pregnancy care programs as it was a non-pharmacological approach that was likely to be convenient for pregnant women in their coping with maternal distress [19].

In a study in which the prescribed consumer-based mobile meditation approach was used during the COVID-19 pandemic, a significant decrease was identified in obstetrics and gynecology patients' perceived distress, depression and anxiety levels in comparison to obstetrics and gynecology patients who received the standard care [20]. However, there is no study showing that MBSR was applied among pregnant women during the COVID-19 pandemic. On the other hand, in the relevant literature, it is not only emphasized that disasters and epidemics could give rise to challenges in the presentation of psychological assistance services but also underlined that online programs would be an effective method in the COVID-19 pandemic period. By integrating technology into psychological approaches, this type of program will extend more access to people [21]. Alleviating psychological distress in pregnant women diagnosed with COVID-19 is an important goal for the health of pregnant women and fetuses. Studies about COVID-19 have pertained mostly to the prevention and treatment of the disease. Some studies have examined pregnant women's psychological health problems during the COVID-19 pandemic. Although these studies have proposed a series of intervention methods for these psychological challenges, no study evaluated the effectiveness of these methods.

This study aims to analyze the effectiveness of the MBSR approach in preventing distress, anxiety and childbirth fear in pregnant women diagnosed with COVID-19.

The hypothesis of the study was as follows: The online MBSR program may be effective in reducing the distress, anxiety and childbirth fear levels of pregnant women diagnosed with COVID-19.

2. Materials and methods

2.1. Design and sample

This study was designed as a randomized-controlled trial to identify the effects of a live online MBSR program on distress, anxiety and childbirth fear in pregnant women diagnosed with COVID-19. The study was performed with pregnant women who were registered at the relevant institutions affiliated with Adıyaman Provincial Directorate of Health in the province of Adıyaman in the southeast of Turkey and tested positive for COVID-19 based on their Polymerase Chain Reaction (PCR) tests. In the study, COVID-19 records were examined for nine months between March and November 2020. According to the Health Directorate records, 165 pregnant women were diagnosed with COVID-19 in the province in the aforementioned period. The incidence of COVID-19 infection was approximately 6% for 2,750 pregnant women registered at the relevant institutions in March–November 2020.

An ad hoc power analysis was performed to estimate the appropriate sample size. In the literature review, it was determined that for the primary outcome of the study, the mean distress score in pregnancy, was previously reported as 62.35 (standard deviation 11.28) [22]. Accordingly, assuming that the mean post-intervention distress score would decrease by seven points in the study, the minimum required samples size was calculated as 42 pregnant women in each group, with a 5% margin of error and a two-tailed significance level, in a 95% confidence interval, and an 80% power to represent the population (42 pregnant women for the experimental group and 42 pregnant women for the control group).

The study included all pregnant women who had internet access, tested positive for COVID-19 in the last three months (since it was presumed that the psychological effects of the COVID-19 infection would last for a maximum of three months) and had no psychiatric problem according to their medical records. Pregnant women who had a gestational age above 36 weeks or gave birth during the research process were excluded from the study. The pregnant women were selected for the sample using the simple random sampling method. For randomization, the women were assigned to the groups by using the Random Integer Generator in the Numbers tab on the website www.random.org. At the beginning of the study, the numbers to be assigned to the experimental and control groups were designated by lot. The women who were assigned the Number 1 formed the experimental group, whilst the women who were assigned the Number 2 formed the control group. A total of 102 pregnant women were evaluated in terms of satisfying the inclusion criteria. All of these pregnant women agreed to participate in the study. However, 18 of them were left out of the study (3 women who were past their 36 the gestational week, 4 women who gave birth during the study period, 6 women who did not continue to attend the MBSR sessions, and 5 women who did not fill in the form completely) (Figure A1).

2.2. Measures

The data were collected from December 2020 to March 2021. The pregnant women assigned to the experimental and control groups were informed about the study via phone calls by the researchers. The survey form was developed by using Google Forms (https://docs.google.com/forms), and the link to the survey form was sent to the pregnant women via WhatsApp. The informed consent form was presented on the first page of the online survey form. In the pretest phase, the participants were asked to fill in a web-based survey form (baseline) that included demographic and pregnancy-related questions besides the data collection measures used in the study. The posttest data were obtained by using the same method at the end of four weeks.

In the data collection process, an Information Form, the Revised Prenatal Distress Questionnaire (NuPDQ), the Beck Anxiety Inventory (BAI) and the Childbirth Attitudes Questionnaire (CAQ) were used.

2.2.1. Information Form

The form prepared by the researchers comprised questions on the participants' sociodemographic and obstetric characteristics (e.g., age, education level, employment status, week of pregnancy, total number of children) and questions about their COVID-19 experience (e.g., symptoms, hospitalization, time of diagnosis).

2.2.2. Revised Prenatal Distress Questionnaire (NuPDQ)

Revised by Lobel (2008), the 17-item NuPDQ is designed to identify pregnant women's social relationships, their physical and emotional symptoms in pregnancy, and the levels of their worries about both themselves and their babies [23]. The validity and reliability study for NuPDQ was performed by Yüksel and Durna (2011), and the Cronbach's alpha internal consistency coefficient of the scale was found as 0.85. In NuPDQ, designed as a three-point Likert-type scale where each item is scored from 0 (never) to 2 (very often), the total score is calculated by adding the scores obtained from responses given to the items. The minimum and maximum scores to be obtained from NuPDQ are 0 and 34. A higher total score indicates a higher level of perceived prenatal distress. There is no cut-off point in the Turkish version of the scale [24]. The Cronbach's alpha coefficient of the scale was calculated as 0.88 in this study.

2.2.3. Beck Anxiety Inventory (BAI)

BAI, which was adapted to Turkish by Ulusoy, Şahin and Erkmen (1998), aims to identify the anxiety levels of individuals. Designed as a four-point Likert-type scale where each item is scored from 0 (not at all) to 3 (severe), BAI has 21 items. The minimum and maximum scores in

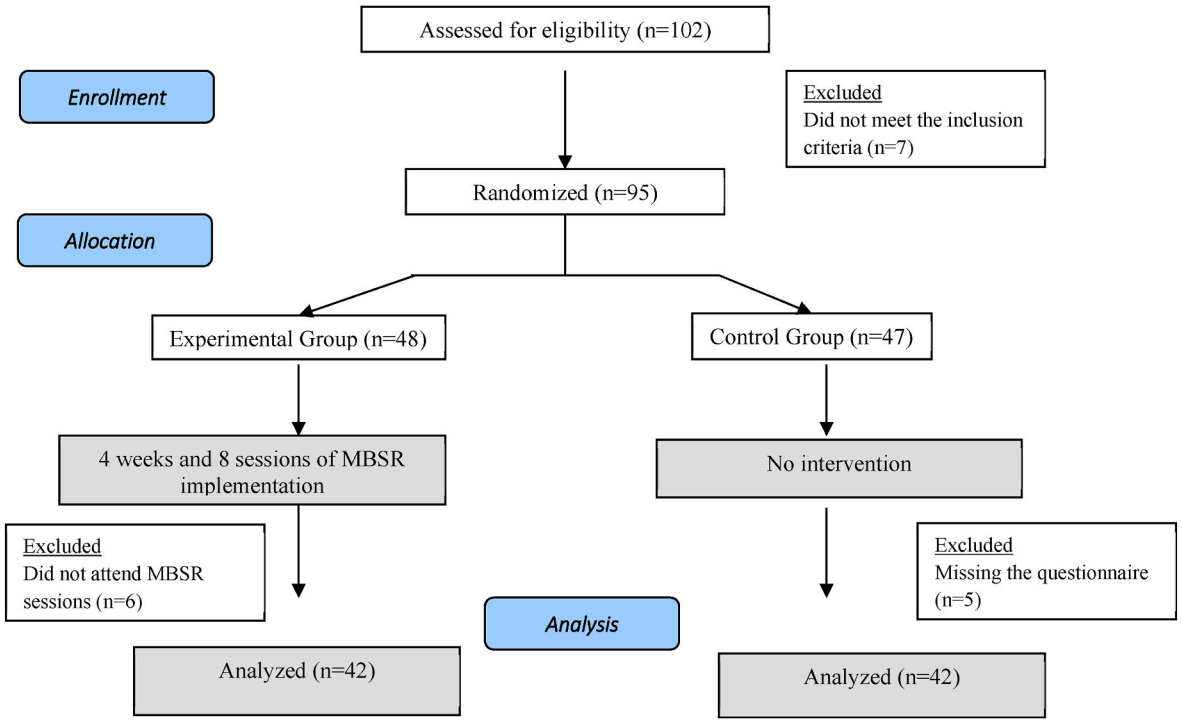

Figure A 1. Allocation of participants according to the CONSORT 2010 flow diagram.

BAI are 0 and 63. A higher total score shows a higher anxiety level. There is no cut-off point in the Turkish version of the scale. The Cronbach's alpha coefficient of the scale was previously reported as 0.93 [25]. In this study, the Cronbach's alpha coefficient of BAI was calculated as 0.93.

2.2.4. *Childbirth Attitudes Questionnaire (CAQ)*

The validity and reliability study for CAQ that was developed to measure childbirth fear was performed in Turkish by Dönmez et al. (2014), and the Cronbach's alpha coefficient of the scale was found as 0.82. Designed as a four-point Likert-type scale where each item is scored from 1 (no anxiety) to 4 (high anxiety), CAQ has 16 items. The minimum and maximum scores of CAQ are 16 and 64. A higher total score indicates a higher level of childbirth fears. There is no cut-off point in the Turkish version of the scale [26]. In this study, the Cronbach's alpha coefficient of the scale was calculated as 0.91.

2.3. *Intervention*

In the study, the MBSR program was provided to the participants free of charge by the researcher, S.Ö.C., who is a specialist midwife. The researcher had participated in a MBSR program and received basic training in Mindfulness Therapy. The training course attended by the researcher was offered by professionally certified instructors and lasted for eight weeks (a total of 24 h, 2–3 h a day). During the training process, by doing meditations that would raise mindfulness according to each newly introduced topic of the day (mind-body meditation, visual meditation, mindful eating, mindfulness of the five senses, compassion meditation, coping with difficult situations) and supporting these meditations with home assignments, mindfulness skills are provided to the participant (https://mindfulnessinstitute.com.tr/egitimler/mbsr/#1566846120719-6fe02320-fc1f). After completing the training course, the researcher launched the intervention in January 2021. The participants received no financial incentive for participating in the study. The live online MBSR program was provided to the experimental group via computer for four weeks. Taking into consideration the hours when the pregnant women were available, two sessions per week were organized for the participants, constituting a total of eight sessions throughout 4 weeks, under the MBSR program. Addressed to groups of 4–5 persons, each session took approximately 40–60 min. During the entire MBSR program, the opportunity for interactive participation in the sessions via questions and answers was offered to the participants women. Besides, during the entire MBSR program and after each session, consultancy and support were extended in meetings to the participants who had additional questions. In the intervention, the MBSR sessions were based on the meditation techniques of Mindfulness Therapy. In all sessions, body and breath exercises, body, mindfulness movement and breathing techniques for 3 min were practiced by the participants based on the researcher's instructions [15,18]. Moreover, the participants were asked to practice these techniques as home assignments according to the meditation videos sent by the researcher via WhatsApp. These meditation techniques aimed to enable the participants to focus their attention on the current moment, observe their experiences, bodies, emotions and thoughts from within themselves, act without bias and haste, and accept themselves as they were.

2.4. *Data analysis*

The data were analyzed by using the SPSS 25.0 for Windows (Statistical Package for the Social Sciences, Chicago, IL, USA). The descriptive statistics are expressed as the frequencies, percentages, means, and standard deviations. Chi-squared test was used in the inter-group comparisons of the categorical variables. Fisher's exact test of significance was used in place of chi-squared test, particularly for small samples. Independent-samples *t*-test was utilized to compare the experimental and control groups, while paired-samples *t*-test was used for the intra-group comparisons. No certain basic demographic variable was taken into account while performing the eta-squared analysis. The level of statistical significance was accepted as $p < 0.05$.

2.5. *Ethical considerations*

Before starting the study, ethical approval was obtained from the Non-Invasive Clinical Trials and Publications Ethics Committee of İnönü

University in the Malatya province of Turkey (Endorsement No: 2020/1381), and written permission was received from the Provincial Directorate of Health (No: 12). Besides, COVID-19-Related Scientific Research Permission was obtained from the Ministry of Health of Turkey (Form code: 2020-12-07T22_00_01). Upon being informed about the research on the first page of the online survey form, the pregnant women were asked to express their informed consent to participate in the study. After the posttest phase of the study was completed, the online MBSR program that was provided to the pregnant women in the experimental group was offered by the researcher also to the pregnant women in the control group.

3. Results

The study was completed with a total of 84 pregnant women diagnosed with COVID-19 (42 in the experimental group and 42 in the control group). Six women from among the 48 women who were initially included in the experimental group were excluded from the study as they did not participate in the entire online program, whereas five women from among the 47 pregnant women who were initially included in the control group were excluded for not filling in the survey form completely.

The characteristics of the participants, including education status, employment status, income status, parity, number of living children, age and pregnancy week, were not significantly different between the experimental and control groups ($p > 0.05$) (Table A1).

In the study, the participants had certain questions about their physical symptoms. In this respect, there was a statistically significant difference between the two groups based on their statuses of experiencing fever and muscle pain ($p < 0.05$), whereas there was no statistically significant difference between the two groups based on their experiences of other symptoms (respiratory distress, cough, sore throat, loss of taste and smell, COVID-19 diagnostic status, presence of chronic disease, hospitalization status) ($p > 0.05$) (Table A2).

Table A 3 shows the comparison results of the mean total pretest-posttest NuPDQ, BAI and CAQ scores of the participants in the experimental and control groups. Accordingly, the mean NuPDQ, BAI and CAQ total mean scores of the participants were compared between the groups after the MBSR intervention, and the differences between the groups were found to be statistically significant in favor of the experimental group ($p < 0.001$). In the control group, the mean total NuPDQ, BAI and CAQ scores of the participants significantly decreased after the MBSR intervention ($p < 0.001$) (Table A 3). Moreover, it was determined that the difference between the mean total NuPDQ, BAI and CAQ scores was found to be statistically significant in favor of the experimental group ($p < 0.001$). The eta-squared values found in the analyses indicated a high effect size of the intervention [27] on the NuPDQ, BAI and CAQ mean scores of the participants (respectively $\eta^2 = 0.525$, $\eta^2 = 0.626$, $\eta^2 = 0.653$) (Figure A 2a-c).

Table Table 1
Characteristics of the participants.

Variables	Experimental group (n = 42)		Control group (n = 42)		Test[a] and p-value
	n	%	n	%	
Education status					
High school or below	19	45.2	22	52.4	$\chi^2 = 0.429$, p = 0.513
University or above	23	54.8	20	47.6	
Employed					
Yes	13	31.0	14	33.3	$\chi^2 = 0.055$, p = 0.815
No	29	69.0	28	66.7	
Income status					
Low	6	14.3	6	14.3	$\chi^2 = 1.600$, p = 0.449
Medium	32	76.2	28	66.7	
High	4	9.5	8	19.0	
Parity					
Primigravida	17	40.5	18	42.9	$\chi^2 = 0.049$, p = 0.825
Multigravida	25	59.5	24	57.1	
Number of living children					
0	21	50.0	18	42.9	$\chi^2 = 0.564$, p = 0.754
1	12	28.6	15	35.7	
2+	9	21.4	9	21.4	
	Mean ± SD		**Mean ± SD**		**Test[b] and p-value**
Age (range 18–41)	29.36 ± 5.72		30.74 ± 4.73		t = −1.204, p = 0.232
Pregnancy week (range 7–35)	23.40 ± 6.87		22.33 ± 4.94		t = 0.820, p = 0.415

[a] Chi-squared test.
[b] Independent-samples *t*-test.

Table Table 2
Comparison of the physical symptoms of the participants in the experimental and control groups (n = 84).

Physical symptoms	Experimental group (n = 42)		Control group (n = 42)		p-value[a]
	n	%	n	%	
Fever					p = 0.004
Yes	11	26.2	24	57.1	
No	31	73.8	18	42.9	
Respiratory distress					
Yes	–	–	–	–	
No	42	100	42	100	
Cough					p = 0.137
Yes	6	14.3	2	4.8	
No	36	85.7	40	95.2	
Sore throat					p = 0.776
Yes	8	19.0	7	16.7	
No	34	81.0	35	83.3	
Muscle pain					p = 0.011
Yes	6	14.3	–	–	
No	36	85.7	42	100	
Loss of taste and smell					p = 0.314
Yes	1	2.4	–	–	
No	41	97.6	42	100	
Covid diagnostic status					p = 0.449
Currently PCR (+)	13	31.0	10	23.8	
Max 3 months ago PCR (+) Currently PCR (−)	29	69.0	32	76.2	
Has any chronic disease*					p = 0.397
Yes	4	9.5	2	4.8	
No	38	90.5	40	95.2	
Hospitalized					p = 0.397
Yes	8	19.0	5	11.9	
No	34	81.0	37	88.1	

PCR: Polymerase Chain Reaction, * Such as hypertension, diabetes mellitus, [a] Fisher's Exact Test.

4. Discussion

This study demonstrated that the MBSR program provided to pregnant women who were diagnosed with COVID-19 could reduce the pregnant women's prenatal distress, anxiety and childbirth fear levels. The results of this study showed that, after the implementation of the MBSR program, the prenatal distress, anxiety and childbirth fear levels of the participants in the experimental group decreased significantly in comparison to the levels of those in the control group ($p < 0.001$, Table A 3). Even though the prenatal distress, anxiety and childbirth fear levels of the control group also increased, the experimental group had significantly lower mean prenatal distress, anxiety and childbirth fear

Table Table 3
Comparison of the NuPDQ, BAI and CAQ total pretest–posttest mean scores of the participants in the experimental and control groups.

	Experimental group (n = 42)	Control group (n = 42)	Test[a] and p-value
	Mean ± SD	Mean ± SD	
NuPDQ Pretest	19.50 ± 7.15	17.16 ± 5.66	t = 1.657, p = 0.101
NuPDQ Posttest	7.47 ± 3.98	13.97 ± 3.33	t = −8.105, p < 0.001
Test[b] and p-value	t = 9.245, p < 0.001	t = 2.826, p = 0.007	
BAI Pretest	26.02 ± 10.93	19.19 ± 9.42	t = 3.067, p = 0.003
BAI Posttest	6.50 ± 5.98	14.47 ± 5.58	t = −6.315, p < 0.001
Test[b] and p-value	t = 9.456, p < 0.001	t = 2.660, p = 0.011	
CAQ Pretest	43.95 ± 7.34	40.50 ± 8.81	t = 1.949, p = 0.055
CAQ Posttest	26.38 ± 5.04	36.11 ± 5.67	t = −8.314, p < 0.001
Test[b] and p-value	t = 13.859, p < 0.001	t = 12.769, p = 0.008	

NuPDQ: Revised Prenatal Distress Questionnaire, BAI: Beck Anxiety Inventory, CAQ: Childbirth Attitudes Questionnaire, SD: Standard Deviation.
[a] Independent-samples *t*-test.
[b] Paired-samples *t*-test.

scores (p < 0.001, Table A 3, Figure A2). It may be considered that the decrease observed in the prenatal distress, anxiety and childbirth fear levels of the control group might have occurred due to the an increase in the social and family support they received after they were diagnosed with COVID-19 and their utilization of personal coping mechanisms. As a matter of fact, in a study conducted to identify the stress levels, social support, health behaviors and stress reduction strategies in pregnant women during the COVID-19 pandemic, the women's pregnancy periods before and after the pandemic were compared, and the study demonstrated that the women talked to their spouses, families and other people more in the period after the pandemic than they did so in the period before the pandemic, and the numbers of pregnant women who did Pilates, spent time on social media or adopted relaxation and hypnobirthing behaviors to reduce stress in the period after the pandemic in comparison to these numbers before the pandemic [28]. Besides, the World Health Organization (WHO) underlined the importance of paying attention to the increased levels of stress and anxiety felt by pregnant women, recently-pregnant women, their partners, children and families in association with COVID-19, and WHO also recommended that healthcare practitioners should support pregnant women appropriately [29].

In the relevant literature, several studies have identified the distress and anxiety levels of pregnant women who were diagnosed with COVID-19. In a study conducted to find out pregnant women's anxiety and fear levels during the COVID-19 pandemic, it was ascertained that most pregnant women had fears about COVID-19 infection, their fear levels were above average, and the women with fear levels above average had higher anxiety levels than those with fear levels below average [30]. In a web-based cross-sectional study carried out in Iran, pregnant women's anxiety levels during the COVID-19 pandemic period were evaluated, and it was found that they had high levels of anxiety about childbirth in the pandemic period [31]. Moreover, Hamzehgardeshi et al. (2021) developed a structural equation model to analyze the relationship of COVID-19 fear and anxiety with the pregnancy experience and mental health disorders in pregnant women. According to the results of the path analysis conducted in their study, COVID-19 anxiety and concerns during pregnancy were variables that had statistically significant positive correlations with mental health only through one path, which was direct, and of the two variables, COVID-19 anxiety had the highest

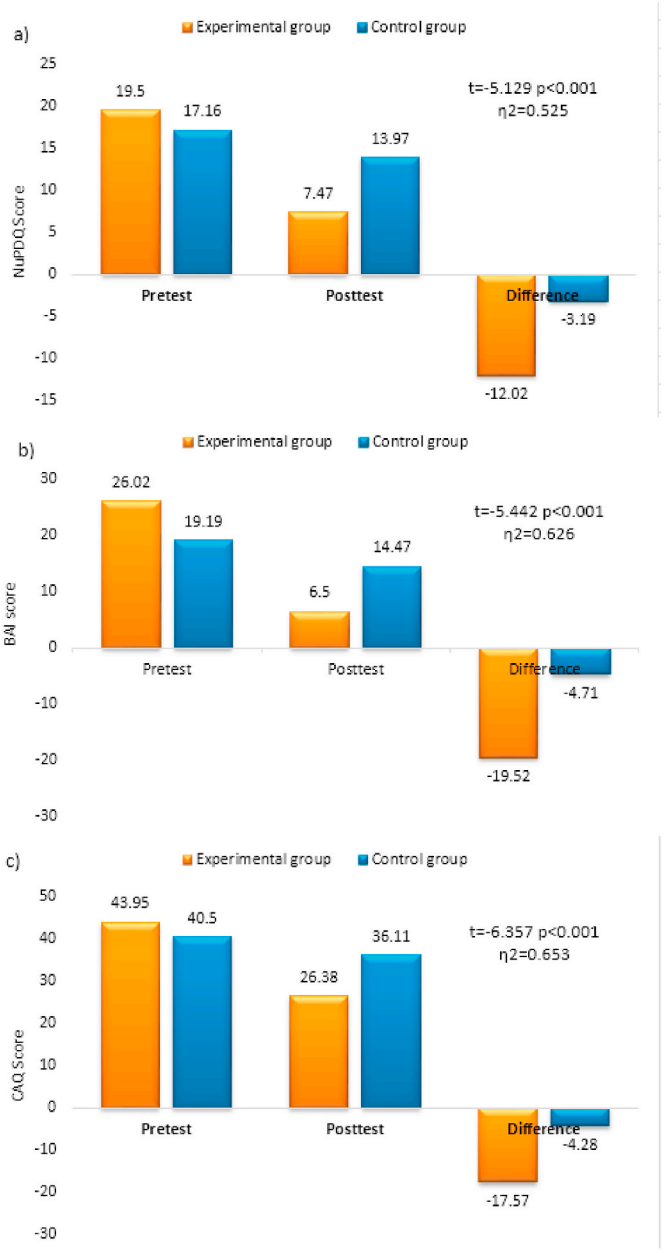

Figure A 2. a) Comparison of the NuPDQ total scores and score differences of the experimental and control groups b) Comparison of the BAI total score and score differences of the experimental and control groups c) Comparison of the CAQ total scores and score differences of the experimental and control groups.

positive direct correlation with mental health. In light of findings here and in other studies in the literature, it is considered that the MBSR program used as a response to COVID-19 infection that is likely to cause pregnant women to have stress and anxiety can reduce their prenatal distress, anxiety and childbirth fear levels.

The effects of MBSR programs on different groups have been in previous studies, and results similar to those of this study were obtained. In a study exploring the effectiveness of a MBSR program that was utilized to reduce the childbirth fears of women with one child, women who gave birth at least six years ago and avoided having pregnancy due to childbirth fear were assigned to experimental and control groups. Following the implementation of the MBSR program among these women (eight sessions, each of which lasted 90 min), the childbirth fear levels of the women in the experimental group decreased [32]. Moreover, in a randomized-controlled trial conducted to evaluate the effects

of a MBSR program, which was provided to pregnant women in six sessions, on anxiety and self-efficacy in coping with childbirth, it was identified that the effectiveness of the MBSR program continued for a long time (one month after the implementation), the participants' distress scores in relation to pregnancy anxiety decreased, and the experimental group had a significantly lower mean distress score than the control group [33]. Likewise, in another study performed to evaluate the effects of a MBSR program on prenatal distress, anxiety and depression, the MBSR program was provided to pregnant women in the experimental group in eight sessions, and it was found that the program was effective in reducing the women's prenatal distress and anxiety levels [34]. Furthermore, a study that examined the effects of a MBSR program on the quality of pregnant women's lives and their psychological well-being levels revealed that the MBSR program (8 sessions) had positive effects on quality of life, psychological well-being and general state of health in the pregnant women in the experimental group [35].

In this study, the physical symptoms exhibited by the participants were also evaluated. Accordingly, it was discerned that all pregnant women included in the sample exhibited at least one symptom (fever, cough, sore throat, muscle pain, or loss of taste and smell), a part of them had chronic diseases, and some of them were hospitalized. Previous studies have also shown that people who are diagnosed with COVID-19 have had similar symptoms. In a study that analyzed the psychological effects of COVID-19 on patients with chronic diseases, it was found that inpatients exhibited the same physical symptoms [36]. According to the report of the United States Centers for Disease Control and Prevention (CDC) that is in support of the finding of this study, the symptoms most frequently observed in pregnant women were cough, headache, muscle aches, fever, sore throat, shortness of breath, and new-onset loss of taste or smell, while other symptoms included nausea, vomiting, fatigue, diarrhea, and rhinorrhea [37]. In the annual report released by the CDC about hospitalization during the COVID-19 pandemic, it was stated that the percentage of women hospitalized during pregnancy due to COVID-19 was 29.4% [38].

4.1. Limitations

This study had certain limitations. One of its limitations was that the long-term effect of the MBSR program (the period after one month following its application) besides its effect in the post-natal period was not evaluated. Furthermore, as the MBSR program in this study was provided solely to pregnant women who had tested positive for COVID-19, constituting a small sample size, this study may be considered a preliminary study. Therefore, the results cannot be generalized to all pregnant women. Another limitation of this study was the fact that there is no cut-off point in the Turkish versions of NuPDQ, BAI and CAQ, which were used as measurement tools in the study. It may be recommended to evaluate the cut-off values of these scales in future studies.

5. Conclusion and recommendations

This study showed that the MBSR program provided to the pregnant women who were diagnosed with COVID-19 reduced their levels of prenatal distress, anxiety, and childbirth fear. With the onset of the COVID-19 pandemic, the expectations and childbirth distress and anxiety levels of pregnant women who are among high-risk groups have changed significantly, and pregnant women have needed more psychological support in this period. Moreover, the findings of this study clearly underlined the importance of providing the support needed by pregnant women testing positive for COVID-19 more effectively. For healthcare practitioners to be able to use MBSR programs actively, planning in-service training courses and making health policies needed in this direction is of importance. This way, it will be ensured that the support needed by pregnant women who test positive for COVID-19 in the pandemic period is given to them.

Funding

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

CRediT author contribution statement

Esra Güney: Conceptualization, Data curation, Formal analysis, Methodology, Investigation, Writing - original draft, Writing - review & editing.

Sıdıka Özlem Cengizhan: Conceptualization, Methodology, Investigation, Data curation, Writing - original draft.

Esra Karataş Okyay: Conceptualization, Methodology, Data curation, Investigation, Supervision, Writing - original draft.

Zeynep Bal: Conceptualization, Methodology, Investigation, Data curation, Supervision, Writing - original draft.

Tuba Uçar: Conceptualization, Formal analysis, Methodology, Investigation, Data curation, Writing - original draft, Writing - review & editing.

Declaration of competing interest

All authors declare no conflict of interest. No financial support was received for this study. No other relationships/conditions/circumstances are present.

Acknowledgement

We are thankful to the pregnant women who participated in our study.

References

[1] World Bank, The Global Economic Outlook During the Covid-19 Pandemic: A Changed World, 2020 worldbank. org/en/news/feature/2020/06/08/the-global-economic-outlookduring-the-covid-19-pandemic-a-changed-world. (Accessed 14 April 2021).

[2] B. Chmielewska, I. Barratt, R. Townsend, E. Kalafat, J. van der Meulen, I. Gurol-Urganci, et al., Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis, Lancet Global Health 9 (2021) e759–e772, https://doi.org/10.1016/S2214-109X(21)00079-6.

[3] T. Roberton, E.D. Carter, V.B. Chou, A.R. Stegmuller, B.D. Jackson, Y. Tam, et al., Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study, Lancet Global Health 8 (2020), e901, https://doi.org/10.1016/S2214-109X(20)30229-1, 08.

[4] D.A. Schwartz, The effects of pregnancy on women with COVID-19: maternal and infant outcomes, Clin. Infect. Dis. 71 (16) (2020) 2042–2044, https://doi.org/10.1093/cid/ciaa559.

[5] Şat Sö, Sözbir Şy, Use of mobile applications by pregnant women and levels of pregnancy distress during the COVID-19 (Coronavirus) pandemic, Matern. Child Health J. (2021) 1–12, https://doi.org/10.1007/s10995-021-03162-y.

[6] O. Taubman–Ben-Ari, M. Chasson, S.A. Sharkia, E. Weiss, Distress and anxiety associated with COVID-19 among Jewish and Arab pregnant women in Israel, J. Re- product. Infant Psychol. 38 (3) (2020) 340–348, https://doi.org/10.1080/02646838.2020.1786037, 2020.

[7] Y. Wu, C. Zhang, H. Liu, C. Duan, C. Li, J. Fan, et al., Perinatal depressive and anxiety symptoms of pregnant women during the coronavirus disease 2019 outbreak in China, Am. J. Obstet. Gynecol. 223 (2) (2020) 240, https://doi.org/10.1016/j.ajog.2020.05.009, e1.

[8] I. Mappa, F.A. Distefano, G. Rizzo, Effects of coronavirus 19 pandemic on maternal anxiety during pregnancy: a prospectic observational study, J. Perinat. Med. 48 (6) (2020) 545–550, https://doi.org/10.1515/jpm-2020-0182.

[9] H.K. Sut, B. Kucukkaya, Anxiety, depression, and related factors in pregnant women during the COVID-19 pandemic in Turkey: a web-based cross-sectional study, Psychiatr. Care 57 (2021) 860–868, https://doi.org/10.1111/ppc.12627.

[10] H. Bayrampour, L. Tomfohr, S. Tough, Trajectories of perinatal depressive and anxiety symptoms in a community cohort, J. Clin. Psychiatr. 77 (11) (2016) e1467–e1473, https://doi.org/10.4088/JCP.15m10176.

[11] M.E. Coussons-Read, Effects of prenatal stress on pregnancy and human development: mechanisms and pathways, Obstet. Med. 6 (2) (2013) 52–57, https://doi.org/10.1177/1753495X12473751.

[12] M.J. Meaney, Perinatal maternal depressive symptoms as an issue for population health, Am. J. Psychiatr. 175 (11) (2018) 1084–1093, https://doi.org/10.1176/appi.ajp.2018.17091031.

[13] S. Grigoriadis, L. Graves, M. Peer, L. Mamisashvili, G. Tomlinson, S.N. Vigod, et al., Maternal anxiety during pregnancy and the association with adverse perinatal outcomes: systematic review and meta-analysis, J. Clin. Psychiatr. 79 (5) (2018) e1–22, https://doi.org/10.4088/JCP.17r12011.
[14] P. Kotabagi, L. Fortune, S. Essien, M. Nauta, W. Yoong, Anxiety and depression levels among pregnant women with COVID-19, Acta Obstet. Gynecol. Scand. Suppl. 99 (7) (2020) 953–954, https://doi.org/10.1111/aogs.13928.
[15] H. Woolhouse, K. Mercuri, F. Judd, S.J. Brown, Antenatal mindfulness intervention to reduce depression, anxiety and stress: a pilot randomised controlled trial of the MindBabyBody program in an Australian tertiary maternity hospital, BMC Pregnancy Childbirth 14 (2014) 369, https://doi.org/10.1186/s12884-014-0369-z.
[16] C. Surawy, F. McManus, K. Muse, J.M.G. Williams, Mindfulness-based cognitive therapy (MBCT) for health anxiety (hypochondriasis): rationale, implementation and case illustration, Mindfulness 6 (2) (2015) 382–392, https://doi.org/10.1007/s12671-013-0271-1.
[17] X. Liu, W. Xu, Y. Wang, J.M.G. Williams, Y. Geng, Q. Zhang, Can inner peace be improved by mindfulness training: a randomized controlled trial, Stress Health 31 (3) (2013) 245–254, https://doi.org/10.1002/smi.2551.
[18] A. Dhillon, E. Sparkes, R.V. Duarte, Mindfulness-based interventions during pregnancy: a systematic review and meta-analysis, Mindfulness 8 (6) (2017) 1421–1437, https://doi.org/10.1007/s12671-017-0726-x.
[19] Z. Shi, A. MacBeth, The effectiveness of mindfulness-based interventions on maternal perinatal mental health outcomes: a systematic review, Mindfulness 8 (2017) 823, https://doi.org/10.1007/s12671-016-0673-y.
[20] R.B. Smith, N.D. Mahnert, J. Foote, K.T. Saunders, J. Mourad, J. Huberty, Mindfulness effects in obstetric and gynecology patients during the Coronavirus Disease 2019 (COVID-19) pandemic: a randomized controlled trial, Obstet. Gynecol. 137 (6) (2021) 1032–1040, https://doi.org/10.1097/AOG.0000000000004316.
[21] B. Dincer, D. Inangil, The effect of Emotional Freedom Techniques on nurses' stress, anxiety, and burnout levels during the COVID-19 pandemic: a randomized controlled trial, Explore 17 (2) (2021) 109–114, https://doi.org/10.1016/j.explore.2020.11.012.
[22] A.M. Coşkun, G. Okcu, S. Arslan, The impact of distress experienced during pregnancy on prenatal attachment, Perinat. J. 27 (2) (2019) 49–55, https://doi.org/10.2399/prn.19.0272001.
[23] M. Lobel, The Stony Brook Pregnancy Project: Revised Prenatal Distress Questionnaire (NUPDQ) Scoring Information, 2008.
[24] F. Yüksel, Z. Durna, Prenatal distres ölçeği'nin türkçe'ye uyarlanması ve faktör analizi, Hemşirelikte Eğitim ve Araştırma Dergisi. 8 (3) (2011) 43–51 (Turkish).
[25] M. Ulusoy, N.H. Şahin, H. Erkmen, Turkish version of the Beck anxiety inventory: psychometric properties, J. Cognit. Psychother. 12 (1998) 163–172.
[26] S. Dönmez, H. Dağ, N. Çelik, Ö.A. Yeniel, O. Kavlak, Doğum tutum ölçeğinin geçerlilik ve güvenilirlik çalışması, J. Clin. Obstet. Gynecol. 24 (4) (2014) 212–218 (Turkish).
[27] T.R. Levine, C.R. Hullett, Eta squared, partial eta squared, and misreporting of effect size in communication research, Hum. Commun. Res. 28 (4) (2002) 612–625.
[28] K. Matvienko-Sikar, J. Pope, A. Cremin, H. Carr, S. Leitao, E.K. Olander, et al., Differences in levels of stress, social support, health behaviours, and stress-reduction strategies for women pregnant before and during the COVID-19 pandemic, and based on phases of pandemic restrictions, in Ireland, Women Birth 23 (2020), https://doi.org/10.1016/j.wombi.2020.10.010. S1871-5192(20)30367-X.
[29] World Health Organization, Increasing understanding of the impact of COVID-19 for pregnant women and their babies. https://www.who.int/news/item/01-09-2020-increasing-understanding-of-the-impact-of-covid-19-for-pregnant-women-and-their-babies, 2020. (Accessed 14 April 2021).
[30] N. Hossain, M. Samuel, R. Sandeep, S. Imtiaz, S. Zaheer, Perceptions, generalized anxiety and fears of pregnant women about Corona virus infection in the heart of pandemic, Res. Square (2020), https://doi.org/10.21203/rs.3.rs-32235/v1.
[31] Z. Hamzehgardeshi, S. Omidvar, A.A. Amoli, M. Firouzbakht, Pregnancy-related anxiety and its associated factors during COVID-19 pandemic in Iranian pregnant women: a web-based cross-sectional study, BMC Pregnancy Childbirth 21 (2021) 208, https://doi.org/10.1186/s12884-021-03694-9.
[32] M. Pour-Edalati, N. Khezri Moghadam, A. Shahesmaeili, P. Salehi-Nejad, Exploring the effect of mindfulness-based stress reduction on childbirth fear among single-child mothers in the city of Kerman, Iran (2017): a clinical trial study, Medsurg Nurs. J 7 (4) (2018), e90247, https://doi.org/10.5812/msnj.90247.
[33] M. Zarenejad, M. Yazdkhasti, M. Rahimzadeh, Z. Mehdizadeh Tourzani, S. Esmaelzadeh-Saeieh, The effect of mindfulness-based stress reduction on maternal anxiety and self-efficacy: a randomized controlled trial, Brain Behav. 10 (4) (2020), e01561, https://doi.org/10.1002/brb3.1561.
[34] J.Y. Zhang, Y.X. Cui, Y.Q. Zhou, Y.L. Li, Effects of mindfulness-based stress reduction on prenatal stress, anxiety and depression, Psychol. Health Med. 24 (1) (2019) 51–58, https://doi.org/10.1080/13548506.2018.1468028.
[35] S. Basharpoor, M. Salehi, N. Kazemi, E. Soleymani, The effectiveness of mindfulness-based stress reduction training on improving the quality of life and well-being of pregnant women, Nurs. Midwifery J. 16 (6) (2018) 445–454.
[36] S.G. Addis, A.D. Nega, D.G. Miretu, Psychological impact of COVID-19 pandemic on chronic disease patients in Dessie town government and private hospitals, Northeast Ethiopia, Diabetes, Metab. Syndrome 15 (1) (2021) 129–135, https://doi.org/10.1016/j.dsx.2020.12.019.
[37] L.D. Zambrano, S. Ellington, P. Strid, R.R. Galang, T. Oduyebo, V.T. Tong, et al., Update: characteristics of symptomatic women of reproductive age with laboratory-confirmed SARS-CoV-2 infection by pregnancy status - United States, January 22-October 3, 2020, MMWR (Morb. Mortal. Wkly. Rep.) 69 (44) (2020) 1641–1647, https://doi.org/10.15585/mmwr.mm6944e3.
[38] Centers for Disease Control and Prevention. The coronavirus disease 2019 (COVID-19)-Associated hospitalization surveillance network (COVID-NET) https://gis.cdc.gov/grasp/covidnet/COVID19_5.html (accessed 15 June 2021).