

Effects of Virtual Mindfulness Training Program on Pregnant Women's Anxiety and Labor Outcomes during the COVID-19 Pandemic.

El Saida Gouda Nasr¹, Amal Sarhan Eldesokey Genedy², Nehmedo Ezzat Osman³, Rasha Mamdouh Abdelmonem⁴ & Azza Ibrahim Abdelraof⁵

¹. Lecturer in Maternal and Neonatal Health Nursing, Faculty of Nursing, Fayoum University, Egypt.

². Lecturer in Maternal and Neonatal Health Nursing, Faculty of Nursing, Fayoum University, Egypt.

³. Lecturer of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt.

⁴. Lecturer of Psychiatric Nursing, Faculty of Nursing, El-Menia University, Egypt.

⁵. Lecturer of Psychiatric and Mental health Nursing, Faculty of Nursing, Mansoura University, Egypt.

Abstract

Pregnant women experience varying amounts of pregnancy-related anxiety (PRA), which can be harmful to their health and hurt affect pregnancy during covid 19. To address this, virtual mindfulness-based programs (MBPs) have been created to promote maternal and newborn health by decreasing the harmful effects of anxiety. **Aim:** To evaluate the effects of a virtual mindfulness training program on pregnant women's anxiety and labor outcomes during the COVID-19 pandemic. **Design:** Quasi experimental design was utilized(pre - post test among control and intervention group). **Setting:** This research was carried out at two settings in Egypt, namely at the antenatal clinics of the obstetrics and Gynecological Department of Mansoura University Hospitals and at obstetric , labor and gynecological departments of Minia university hospital for maternity and child. **Sample:** A purposive sample was obtained to achieve the aim of the study (an intervention and control group comprising 41 pregnant women each). **Tools:** Four tools were used before and after the virtual mindfulness program, namely a Structured Interview, a pregnancy related questionnaire to assess anxiety levels ; the five facets mindfulness questionnaire and finally follow up sheet which contains labor outcomes. **Results:** findings showed a significant difference in anxiety levels, the five facets of mindfulness between groups after implementation (control, intervention groups). Moreover, there was a difference regarding complications during delivery of neonatal health problems, and the type of feeding between both groups. **Conclusion:** Virtual mindfulness had appositve influence on decreasing level of anxiety, enhancing mindfulness and improving labor outcomes among pregnant women in intervention group in relation to control group post intervention **Recommendations:** generalization of virtual mindfulness program among pregnant women Covid -19 periods.

Keywords: *Virtual mindfulness, Pregnant women's anxiety, Labor outcomes & COVID-19.*

Introduction

In December 2019, a new coronavirus illness (COVID-19) emerged. It had caused significant alterations in one's way of life, bringing about recent problems and alterations in social connections and individual liberties (Anderson et al., 2020). Women during pregnancy, in particular, have been a considerably affected population considering the raises in their stress levels, depression, and/or anxiety during pregnancy (Puertas-Gonzalez et al., 2021). Moreover, one study showed that the COVID-19 pandemic may have utilized added effect on prenatal anxiety among women who are pregnant (Corbett et al., 2020; Mirzadeh & Khedmat, 2020). Fears of quarantine-related loneliness during and after delivery, limited access to healthcare services due to fear of affliction, increased requests for delivery via elective cesarean section, problems with frequent

disinfectant use, and concerns about child care, feeding the baby, and vaccination is all sources of worry and anxiety for pregnant women during pandemics. (Hamzehgardeshi et al., 2021).

Anxiety is a typical reaction to a stressful event. As such, pregnant women are especially vulnerable, compounded by the mental and physical changes that occur during pregnancy. Anxiety symptoms in pregnancy have been determined to be a unique hazard factor for worse Developmental and obstetric outcomes (Howard et al., 2018). Anxiety related pregnancy it's believed that it was a risk factor for mental health issues. in the mother. like postpartum depression and poor bonding, as well as obstetric problems, such as labor length, early birth, and neonatal development impairment (Mappa et al., 2020).

Hormonal changes in women during pregnancy could have a tremendous impact on their emotional health, with prior evidence showing links between these hormonal alterations and cortisol, prolactin, and steroid levels. Moreover, the development of complications, like preterm labor, through pregnancy can likely worsen maternal emotional distress. Worries regarding the pregnancy's progress and well-being of the fetus frequently cause unpleasant psychological reactions like anxiety or emotional lability (Wallwiener et al., 2019).

As such, encouragement throughout pregnancy can help minimize the adverse impacts of stress while also improving the mother's and fetus's health. The current pandemic has significantly hindered psychiatric therapy, which must now be carried out via the internet in many circumstances. However, other studies have shown that this sort of treatment can be useful given that video calls allow for face-to-face interactions (Dennis et al., 2017).

The number of mindfulness-based programs (MBPs) has risen dramatically over the previous two decades. Exploring internal experiences, as thought, affection, and feelings, emotion regulation, self-management, decision-making and recreation, have all been hypothesized as potential processes behind the efficacy of mindfulness-based therapies (MBIs) (Staneva et al., 2015).

Recent research on MBIs for pregnant women has found a wide range of benefits, including a reduction in depressive, anxiety, and pregnancy-related stress symptoms, as well as improvement in delivery self-efficacy. Although the benefits of MBIs are well-documented, the possible danger of MBIs has received less attention (Szpunar & Parry, 2017).

Pregnant women utilize digital health technology regularly and are open to participating in web-based perinatal therapy. Indeed, web-based or mobile therapies could be a useful option, especially for pregnant women experiencing premature labor and having limited mobility. Nonetheless, only a few studies have utilized electronic mindfulness training. Although multiple meta-analyses have examined the efficacy of face-to-face MBIs, evidence has suggested that MBIs delivered via web-based or mobile devices are similarly successful (Lyzwinski et al., 2018).

During the epidemic, midwives helped pregnant and laboring women. (Brussels, 2020). For providing home-based care, especially independent practitioners, specific guidelines are required. Maternity care, unlike curative treatments, provides complete assistance to women going through a normal physiological process; both over and under intervention can result in a significant avoidable burden. Following the relaxation of preventive measures, catch-up campaigns should be

prioritised (Nelson, 2020). Introducing new forms of care, such as telehealth assistance, has been considered a "virtually perfect option" for maintaining care. (Riley et al., 2020).

Significance of the study

Pregnancy raises the risk for (COVID-19) disease. Pregnant women experience varying amounts of pregnancy-related anxiety (PRA) that can have a negative influence on the outcome of their pregnancy. Around 21% of women who are pregnant had suffered from PRA within the COVID-19 pandemic (Hamzehgardeshi et al., 2021). The prevalence of anxiety disorder through pregnancy in developing as well as developed countries have been reported to be around 10% and 25%, respectively. Another study also demonstrates that the prevalence of anxiety disorders ranged from 13% to 21% during pregnancy and 11% to 17% during postpartum (Fairbrother, 2015) Further more study conducted by (Abdelhai, & Mosleh, 2015) in the largest university hospital in Egypt revealed that simultaneous anxiety and depressive manifestations accounted for 63%, whereas 11.4% and 10.4% of them expressed only anxiety and only depression.

Anxiety during pregnancy can lead to negative perinatal outcomes. (Mirzadeh & Khedmat, 2020). Various studies have shown evidence concerning the negative effect of anxiety during pregnancy and birth outcomes or neonatal developmental problems (Glover et al., 2018). Hence, promoting different psychological interventions, such as MPIs, during pregnancy could promote mother and newborn health by reducing the negative impact of stress (Pan et al., 2019). However, considering that the pandemic has become a significant barrier to face-to-face psychological treatments, a virtual mindfulness program was conducted to evaluate its effects on anxiety during pregnancy and labor outcomes.

Finally the researcher noticed through clinical experience that pregnant women during covid 19 are suffering from anxiety related to pregnancy and labor and this will in turn have negative effects and increase risk of poor pregnancy outcomes as increase risk of low birth weight ,preterm labor and neonatal death, therefore this research attempts to gain insight about the effects of A virtual Mindfulness Training Program on Pregnant Women's Anxiety and Labor Outcomes during COVID-19 Pandemic

Aim of the study

The present study pointed to evaluate the effects of virtual mindfulness training program on pregnant women's anxiety and labor outcomes during COVID-19.

Research hypotheses

To accomplish the aim of this search, three hypotheses were tested:

- **Hypothesis I:** Pregnant women who received the virtual mindfulness training program would show lower levels of anxiety compared to the control group.
- **Hypothesis II:** Pregnant women who received the virtual mindfulness training program would exhibit better mindfulness scores compared to the control group.
- **Hypothesis III:** Pregnant women who received the virtual mindfulness training program would exhibit improved maternal and neonatal outcomes.

Theoretical Definitions

Mindfulness is described as the capability to notice one's thinking, body sensations, or emotions in the present moment while maintaining an open and receptive attitude toward them.

Pregnancy-related anxiety (PRA) is defined as fears, preoccupations, and worry regarding pregnancy, delivery, newborn health, and childrearing.

Virtual mindfulness is defined as the use of WhatsApp groups that provide pregnant women with interactive and audiovisual experiences through which they obtain tools and strategies for managing their emotions and feelings.

Labor outcomes include maternal and neonatal outcomes; *maternal outcomes* include gestational age at delivery, mode of delivery, analgesics and complications that occurs during childbirth; and *neonatal outcomes* include birth weight, birth status, neonatal health problems, type and initiation of feeding.

Subjects and Method

Research design

A Quazi experimental design was utilized to compare two groups concerning pregnant women, one receiving the virtual mindfulness training program (intervention group) and the other receiving virtual care without the mindfulness training program (control group).

Research setting

The study was carried out in two settings in Egypt. The first set was at antenatal clinics of the Obstetrics and Gynecological Department of Mansoura University Hospitals, which provided free antenatal care services to women during pregnancy. Clinics were presented on the first floor and waiting for hall with nearly 30 chairs, 1 laboratory and 3 examination rooms (one for 4D ultrasound and the other 2 for routine medical examination). Each examination room consisted of three vehicle chairs, a weighing scale, a

sphygmomanometer and an ultrasound. The antenatal clinics operate 5 days/week from 9.00 AM to 2.00 PM except on Thursday and Friday. The second set was at Obstetrics, Labor and Gynecological Departments of Minia University Hospital for Maternity and Child, one of the important medical and specialized hospitals in North Upper Egypt operated by doctors. Measurements were also taken online, with the data is being collected on a secure site.

Study sample

Purposive sampling was utilized to obtain the participants included in this study given the limitations in recruiting research subjects. Among the recruited women, The intervention group had 41 participants, and the control group had 41. The participants who satisfied the following criteria were included.

Inclusion criteria

- Primigravida and multigravida women are both in their third trimester (over 28 weeks gestational age).
- Single viable fetus at term without congenital anomalies.
- Non-high-risk pregnancy and no medical and psychological diseases.
- Able to read and write and had a mobil phone with Wi-Fi functionality.
- Used Whats App.
- Did not participate in mindfulness training programs at the previous period.
- Willing to take the posttest.

Sampling type

Anon- probability purposive sample technique was used. Available numbers of pregnant women are included in the study then randomly distributed the sample into intervention and control groups. According to **Sekaran (2003)** Sample sizes larger than 30 and less than 500 are appropriate for most research also for simple experimental research with tight experimental controls (matched pairs, etc.), successful research is possible with samples as small as 10 to 20 in sizes. "So sample size was 41 for control group and 41 for intervention group pre and post study.

Sampling technique

Using a lottery approach, pregnant women were randomly assigned to the intervention or control groups. The allocated researcher wrote the names of pregnant women who visited prenatal clinics on identical pieces of paper, folded them well, mixed them up, and then assigned pregnant women to the intervention and control groups at random until the total sample size was reached.

Data collection tools**Tool (I): Structured Interview Questionnaire**

The researchers developed a questionnaire after reviewing related literature (Pan, Chang, Chen & Gau, 2019). The questionnaire was divided into two sections: the first focused on participant sociodemographic characteristics such as age, period of marriage, weeks of gestation, educational level, occupational, consanguinity and family income

The second part encompassed of obstetric history and pattern of antenatal care, such as gravidity, parity, neonatal health problems, current pregnancy desire, type of last delivery, antenatal care (ANC) visit, number of follow-up visits, and the type of follow-up visits.

Tool (II): Pregnancy-Related anxiety questionnaire - revised-2 (PRAQ-R2)

The PRAQ-R2 was adapted by Huizink et al. (2015) to enable reliable and feasible assessment of prenatal anxiety related to pregnancy, the health of the unborn also fetus ,labor and childbirth. The 10-item PRAQ-R2 are scored using five response options (1 = “absolutely not relevant” to 5 = “very relevant”). The total score, which ranged from 10 to 50, as well as that for the subscales fear of giving birth (3 items, ranging from 3 to 15), fear of bearing a physically/mentally handicapped child (4 items, ranging from 4 to 20), and concerns about own appearance (3 items, from 3 to 15), were determined. The questionnaire was administered at two time points: immediately after informed consent was provided and after labor (T2). About 5 min were needed to accomplish the responses.

Tool III: Five facet mindfulness questionnaire

The Five Facet Mindfulness Questionnaire (FFMQ) was adopted from Baer et al. (2006) and translated by Elbahiry et al. (2014). The FFMQ is a 39-item tool that is scores using a 5-point Likert scale ranging from 1 (never or very rarely true) to 4 (very often or always true). The developers of the FFMQ conducted exploratory factor and confirmatory factor analyses on all items using several mindfulness measures to generate the following five subscales of the FFMQ: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity. The questionnaire was administered at two time points: immediately after informed consent was provided and secondly time after of labor (T2). Approximately 15 min was required to complete the questionnaire. The scoring information was as follows: Observe items: 1, 6, 11, 15, 20, 26, 31, 36; Describe items: 2, 7, 12R, 16R, 22R, 27, 32, 37; Act with Awareness items: 5R, 8R, 13R, 18R, 23R, 28R, 34R, 38R; Non-judge items: 3R, 10R, 14R, 17R, 25R, 30R, 35R, 39R; and Non-react items: 4, 9, 19, 21, 24, 29, 33.

Tool IV: Follow up sheet (Labor outcomes): This tool was developed by the researcher to collect data regarding to labor outcomes, including gestational age at delivery, mode of delivery, needing analgesics, as well as complications occurring during childbirth. Neonatal outcomes, including birth weight, birth status, neonatal health problems, type of feeding, and initiation of feeding.

Pilot Study:

A pilot study of 10% of the total sample (n=9) of women who are pregnant was conducted to assess the clarity and usability of the research tools as well as determine the magnitude of time needed to finish them. The final sample did not include pregnant women who took part in the pilot study.

Ethical considerations:

After clarifying the nature of the work, the ethical committee at the faculty of nursing granted official permission. The study participants were given a verbal description of the study's purpose and nature, as well as clarification of the study's nature and purpose of the virtual program. The participant has the opportunity to get out of the study without any rationale at any time. The participant was assured that all data were highly confidential.

Research process

To achieve the research aim, three steps were used in this study: assessment, implementation, and evaluation. These stages began at the beginning of January 2021 and fulfilled by the end of October 2021.

Interviewing and assessment phase

In the early morning, the researchers visited the aforementioned settings and searched through the registration book to find pregnant women who met the criteria. the inclusion criteria. Following that, the researchers met with every pregnant woman individually and invited them to share in the research study. virtually via WhatsApp groups. After agreeing to participate, women who are pregnant were informed about the study's purpose and the time commitment required for participation by the researcher. After obtaining written agreement, all pregnant women were randomized to one of two groups: control or intervention. In the control group, women were allocated to the WhatsApp group who did not participate in the mindfulness training intervention and communication about pregnancy. They were then asked to fill out the Google form questionnaires as their pretest (i.e., the Structured Interview Questionnaire, PRAQ-R2, and FFMQ) after that the participants in control groups were asked to fill the same questionnaire after labor.

Implementation phase

The intervention groups were allocated to the WhatsApp groups that underwent the virtual mindfulness training program and were asked to fill out the Google form before the implementation of the virtual training program (i.e., the Structured Interview Questionnaire, PRAQ-R2, and FFMQ). The intervention group received a message regarding their membership in the WhatsApp group through which they may listen to the sessions provided by the researcher of the program. The intervention participants were divided into subgroups with each group having 10–15 women. After that the subgroups were asked to complete the questionnaire was provided through the link on the WhatsApp then the researcher provided videos on WhatsApp link and asked the participants to listen to information regarding the content of the program. The virtual mindfulness program included sessions comprising two theoretical sessions and six practical sessions. Each session, which lasted for around 30 min, was conducted virtually twice a week by the researchers. At the time of every session the researcher introduced the techniques concerning content of session, communicating and discussing with participants at each point until they can able to practice well. Then the participants had the opportunity to listen to the session and practice the techniques at a later time of the day also had the opportunity for, as well as gain the assistance of the researchers when needed at the same link While control group was only receiving the usual care..

Theoretical part

The theoretical part was conducted virtually using media, posters, and videos over two sessions (each lasting 30 min) covering the following items: greetings, aim, the purpose of the study, the time needed for each session, physiological and psychological changes during the third trimester of pregnancy, mindfulness and its mechanism, the natural process of labor, how virtual mindfulness during pregnancy affects experiences and expectations during and after delivery, and empowering pregnant women.

Practical part

The practical part was conducted through posters, demonstrations, videos, and recordings over six sessions covering the following: mindfulness, breathing technique, body scanning exercise, leaves on stream technique, practicing loving, kindness and compassion, sitting with difficult emotions, and grounding exercise with sensory awareness.

Evaluation phase

The effectiveness of the virtual mindfulness training program was evaluated 2 months after birth using

Tool (II)PRAQ-R2, Tool(III)FFMQ, and(Tool) IV labor outcomes via WhatsApp.

Validity of the study tools:

The face validity of the current study tools was established by a panel of five experts in the field of obstetric nursing and psychiatric nursing from the Faculty of Nursing, Minia University and Mansoura University. Each expert panel was asked to assess the tools for their content, wording, length, coverage clarity, format and overall appearance. Based on their recommendation, all jury members agree that the current study tools were valid and relevant to the aim of the study, so no modification was done by the Jury panel.

Study tool reliability:

The internal consistency of the tools was assessed using Cronbach's alpha, with the Structured Interview Questionnaire having a value of 0.779 and the PRAQ-R2 and FFMQ having a value of 0.87.

Statistical design :

SPSS for Windows version 25.0 was used to conduct all statistical tests (SPSS, Chicago, IL). Continuous data were normally distributed and expressed as mean, standard deviation (SD). The frequency and percentage of categorical data were used. The Chi-square test was used for the comparison of variables with categorical data. The comparisons were determined using the Paired t test for two variables with continuous data and power analysis to measure the effect. Statistical significance was set at $p < 0.05$, while high significance was set at $p < 0.001$.

Table (1): Socio-demographic characteristics of the studied women at the baseline assessment (N=82)

Socio-demographic characteristics	Intervention group (n=41)		Control group (n=41)		Test of significance	
	No.	%	No.	%	X ²	P-value
Age/ years						
20-	10	24.4	16	39.0	2.263	0.531
25-	22	53.7	19	46.3		
30-	3	7.3	2	4.9		
35-	6	14.6	4	9.8		
Mean ± SD	28.15 ± 9.2		26.4 ± 10.5			
Duration of marriage						
1-	17	41.5	19	46.3	0.958	0.619
5-	17	41.5	18	43.9		
10-	7	17.1	4	9.8		
Gestational age/ weeks						
28-	26	63.4	30	73.2	1.619	0.445
32 -	7	17.1	7	17.0		
36 – 50	8	19.5	4	9.8		
Educational level						
Basic	2	4.9	3	7.3	2.344	0.673
Secondary	2	4.9	3	7.3		
Intermediate	5	12.2	7	17.1		
University	15	36.6	9	22.0		
Postgraduate	17	41.5	19	46.3		
occupation						
Housewives	18	43.9	24	58.5	1.757	0.185
Employee	23	56.1	17	41.5		
Housing status						
Nuclear	18	43.9	23	56.1	1.220	0.269
Extended	23	56.1	18	43.9		
Consanguinity						
Yes	6	14.6	4	9.8	0.456	0.500
No	35	85.4	37	90.2		
Income						
Insufficient	12	29.3	12	29.3	1.933	0.380
Sufficient	22	53.7	26	63.4		
Sufficient and save	7	17.1	3	7.3		

Table (2): Obstetric history and pattern of antenatal care among studied women at the baseline assessment (N = 82).

Items	Intervention group (n = 41)		Control group (n = 41)		Test of significance	
	No.	%	No.	%	X ²	P value
Gravidity						
Primgravida	13	31.7	11	26.8	2.631	0.268
2- 3 gravida	25	61.0	22	53.7		
More than 3	3	7.3	8	19.5		
Parity						
One	24	85.7	24	80.0	0.331	0.565
2- 3	4	14.3	6	20.0		
Current pregnancy desire						
Wanted	34	82.9	38	92.7	1.822	0.177
Unwanted	7	17.1	3	7.3		
Type of last delivery						
SVD	3	10.7	1	3.3	2.431	0.297
SVD with Episiotomy	3	10.7	5	16.7		
CS	22	78.6	24	80.0		

Items	Intervention group (n = 41)		Control group (n = 41)		Test of significance	
	No.	%	No.	%	X ²	P value
Antenatal care (ANC) visit						
Yes	36	87.8	39	95.1	1.406	0.236
No	5	12.2	2	4.9		
Number of follow-up visits						
Less than 4 time	16	44.4	19	46.2	1.231	0.267
More than 4 time	20	55.6	20	53.8		
Place of follow-up visits						
Private clinic	33	88.9	29	74.4	3.711	0.06
Hospital	3	11.2	10	25.6		
Type of follow-up visits						
Regular	29	80.6	28	29	0.788	0.374
Irregular	7	19.4	11	7		

Table (3): Comparisons in anxiety levels between intervention and control groups before and after intervention (N = 82).

	Intervention group (n = 41)		Control group (n = 41)	
	Before	After	Before	After
Fear of giving birth	8.6 ± 2.9	7.4 ± 2.3	9.6 ± 3.5	8.6 ± 2.5
t-test (P value)	2.095 (0.039*)		1.481 (0.143)	
Fear of bearing a physically/mentally handicapped child	10.1 ± 4.4	8.7 ± 2.9	11.3 ± 5.1	10.1 ± 3.7
t-test (P value)	1.760 (0.082)		1.269 (0.208)	
Concerns about own appearance	8.3 ± 2.8	5.7 ± 2.7	8.7 ± 2.8	7.5 ± 2.2
t-test (P value)	4.363 (0.0001**)		2.514 (0.187)	
Total pregnancy anxiety	27.1 ± 8.7	21.8 ± 6.5	28.4 ± 9.2	26.1 ± 6.3
t-test (P value)	3.134 (0.002**)		1.792 (.07)	

(*)= Significance

(**)= Highly significance

Table (4): Comparisons of the five facets of mindfulness between intervention and control groups before and after intervention (N = 82).

Domains	Intervention group (n = 41)		Control group (n = 41)	
	Before	After	Before	After
Observe	23.5 ± 6.7	26.8 ± 6.9	21.0 ± 8.4	19.0 ± 3.6
t-test (P value)	2.227 (0.029*)		1.373 (0.174)	
Describe	24.2 ± 3.6	26.6 ± 4.3	23.3 ± 4.8	21.9 ± 3.4
t-test (P value)	2.709 (0.008**)		2.323 (0.023*)	
Awareness	27.2 ± 5.9	26.7 ± 8.8	31.9 ± 5.4	30.9 ± 3.4
t-test (P value)	0.294 (0.769)		1.002 (0.320)	
Non-judge	26.2 ± 6.3	22.4 ± 7.2	31.9 ± 5.2	29.7 ± 3.1
t-test (P value)	2.482 (0.015*)		2.818 (0.04*)	
Non-react	19.1 ± 5.2	22.3 ± 6.2	17.7 ± 5.8	16.1 ± 3.3
t-test (P value)	2.517 (0.01*)		1.539 (0.128)	
Total mindful	120.2 ± 7.9	127.8 ± 9.7	125.8 ± 14.6	118.2 ± 6.8
t-test (P value)	2.383 (0.001**)		3.447 (0.02*)	

Table (5): Labor and neonatal outcomes in the intervention and control groups before the intervention (N = 82).

Items	Intervention group (n = 41)		Control group (n = 41)		Test of significance	
	No.	%	No.	%	X ²	P value
Labor outcomes						
Mode of delivery						
• Spontaneous Vaginal Delivery	7	17.1	7	17.1	1.308	0.520
• SVD with episiotomy	10	24.4	6	14.6		
• Cesarean section	24	58.5	28	68.3		
Analgesic used						
• Yes	33	80.5	36	87.8	0.823	0.336
• No	8	19.5	5	12.2		
Neonatal outcomes						
Gestational age						
37–41 weeks	41	100.0	41	100		
Birth weight						
• Normal weight (2500–3999 g)	40	97.6	37	90.2	1.917 -	0.166
• Overweight (4000 g)	1	2.4	4	9.8		
Birth status						
• Live	41	100.0	39	95.1	0.146	0.264
• Died	0	0.0	2	4.9		
Breastfeeding outcomes						
Type of feeding						
• Natural breast feeding	37	90.2	27	69.2	0.0488	0.001*
• Artificial feeding	4	9.8	12	30.8		
Initiation of feeding						
• Within 1 h after birth	36	87.8	5	12.2	46.884	0.001**
• 2–23 h after birth	4	9.8	26	68.3		
• ≥24 h after birth	1	2.4	8	19.5		

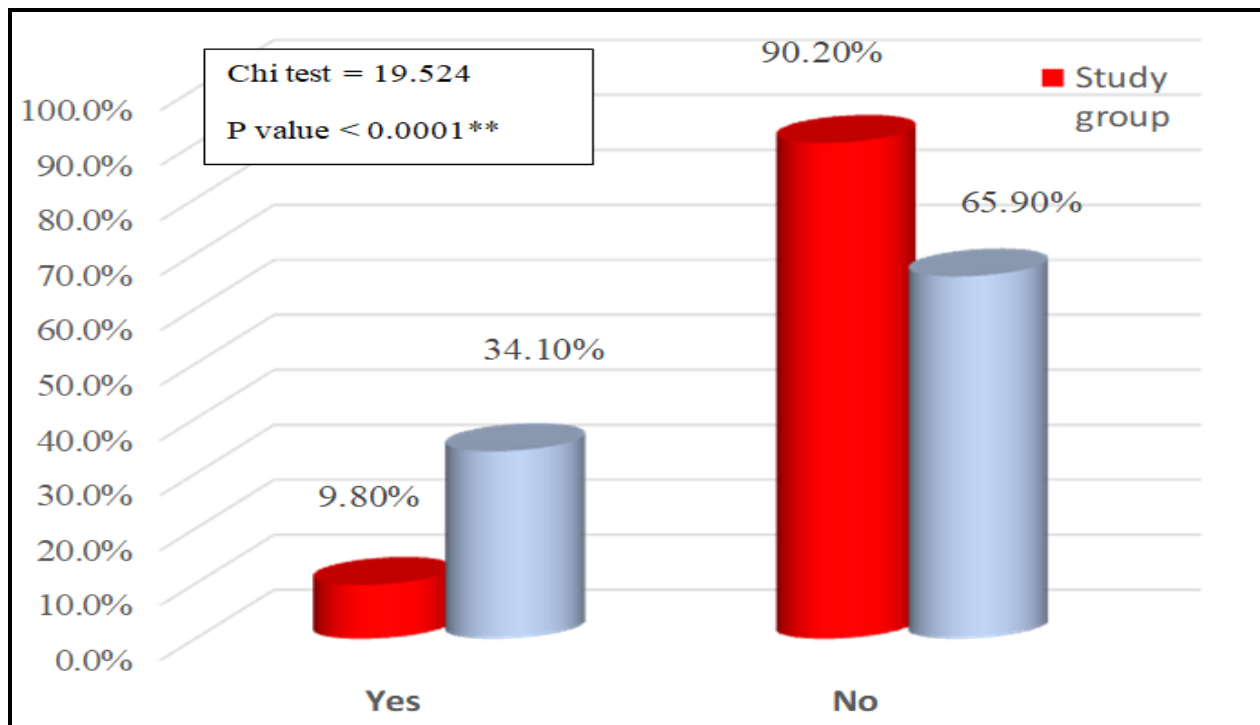


Figure (1): Percentage distribution of complications occurring during delivery in the intervention and control groups after the intervention (n = 82)

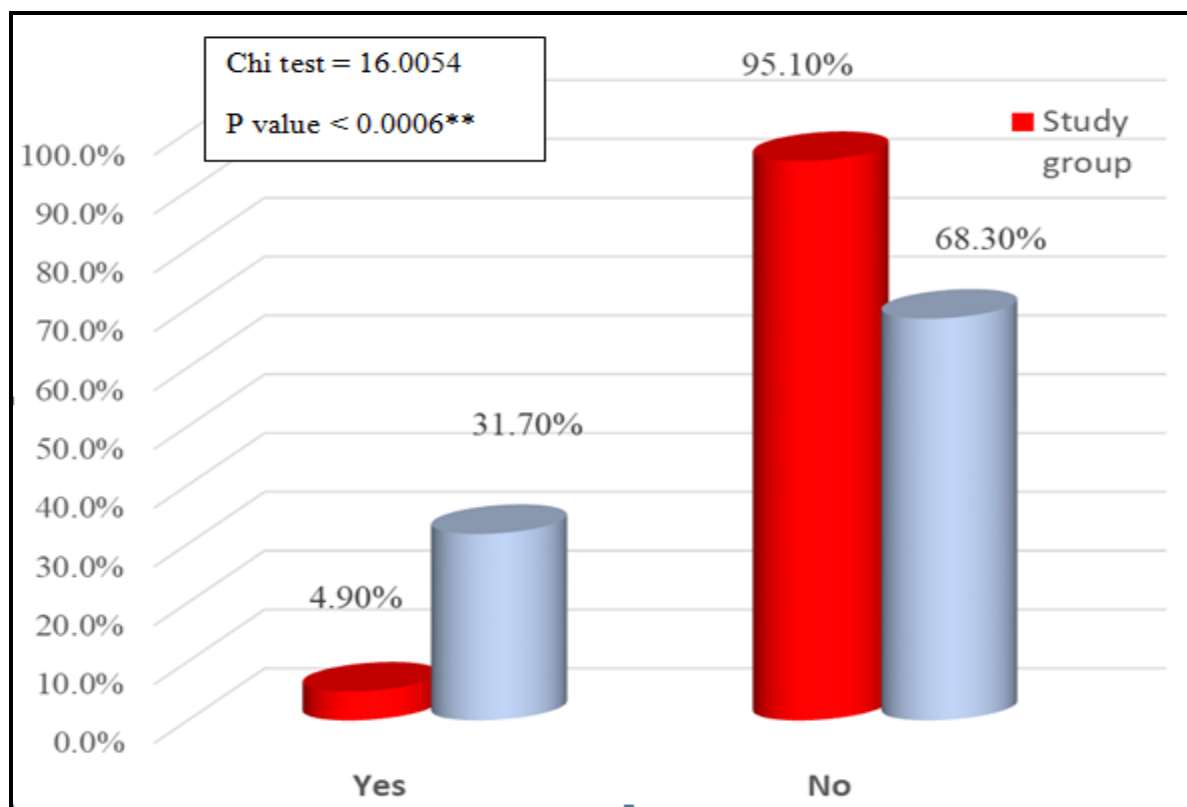


Figure (2): Percentage distribution of neonatal health problems in the intervention and control groups after the intervention (n= 82)

Table (6): Effects of the virtual mindfulness training program on pregnancy related to anxiety and mindfulness (N = 41).

Variable	B	F value	P value	Partial n2	Power
Fear of giving birth	-2.45	4.125	0.002	0.02	0.62
Worries about bearing handicapped child	- 0.93	0.781	0.082	0.07	0.68
Own appearance	-7.25	3.47	0.001	0.01	0.70
Total pregnancy anxiety	-4.25	7.25	0.002	0.02	0.75
Observe	3.15	6.25	0.005	0.05	0.54
Describe	2.75	4.25	0.002	0.02	0.34
Awareness	2.51	0.985	0.769	0.7	0.55
Non-judge	1.25	4.58	0.002	0.02	0.47
Non- react	4.25	5.23	0.001	0.01	0.35
Total mindful	9.08	7.15	0.005	0.05	0.62

Table (1): At the baseline assessment indicates that there were no statistically significant variations concerning socio-demographic variables among the both groups.

Table (2): Showed that no significant differences in obstetric history and pattern of antenatal care between the both groups during the baseline assessment.

Table (3): Illustrated that there were significant differences in fear of giving birth and own appearance were observed among the intervention and control groups, whereas no significant difference in worries

about bearing a handicapped child was observed between both groups (P = 0.002**).

Table (4): Showed that significant differences in the observe, non-react, and non-judge subscales were noted between intervention and control groups. Moreover, a significant difference in the describe subscale was noted between both groups, whereas no significant difference in the awareness subscale was observed between both groups.

Table (5) Shows no significant differences in the mode of delivery and analgesics used between both

groups. However, significant differences in the type and initiation of feeding were observed between both groups ($P = 0.001^*$).

Figure (1): This figure showed that complications that occur during delivery is 9.80% in intervention groups and 34.10% in control groups.

Figure (2): This figure showed that neonatal health problems are 4.90% in intervention groups and 31.70% in the control group post intervention.

Table 6 showed a decrease in anxiety levels in intervention group after program implementation ($B = -4.25$, $P = 0.002$). Moreover, improvement in five facets of mindfulness was noted after program implementation ($B = 9.08$, $P = 0.005$).

Discussion

The current study aimed to evaluate the effects of a virtual mindfulness training program on pregnant women's anxiety and labor outcomes during COVID-19. Notably, the study findings provide empirical evidence for most of the established hypotheses. Pregnant women who received the virtual mindfulness training program demonstrated lower levels of anxiety, better mindfulness scores, fewer complications during delivery, and lesser neonatal health problems compared to the control group.

The results of the present study showed that no significant differences in sociodemographic characteristics and obstetric history among the two groups at the baseline assessment. Moreover, the results of the present study are agreed with a randomized controlled trial by **Pan, Chang, Chen & Gau (2019)** that compared the effects between a mindfulness-based childbirth and parenting (MBCP) program (intervention group) and the hospitals routine childbirth education (comparison group). Furthermore, our findings showed that no significant differences in demographic characteristics and Obstetrics history in terms of age, gestational age, level of education, marital status, income, employment status, and pregnancy intention, between the participating groups.

The present study findings illustrated that significant differences in fear of giving birth and own appearance were observed among intervention and control groups ($P = 0.002^{**}$), whereas no significant differences in worries about bearing handicapped children were observed between both groups, suggesting a decrease in anxiety levels among pregnant women after participating in the virtual mindfulness program. This was consistent with the study by **Apri & Brigitta (2019)** who reported that the effect of mindfulness therapy on the pregnant women's anxiety level in facing childbirth, which revealed a decrease in anxiety levels in the intervention group after mindfulness therapy.

In the same context, our study showed that significant differences in anxiety levels between the intervention (21.8 ± 6.5) and control (26.1 ± 6.3) groups after virtual mindfulness implementation. This result agrees with a previous study showing differences in mean anxiety scores between women who are pregnant in the intervention (score 24.54) and control (score 32) groups. This decrease in anxiety level might be associated with the effects of practicing breathing exercises and other techniques introduced during the mindfulness program, which consequently promoted a state of calmness and rest while helping reduce the elevated pain associated with the progression of pregnancy. Moreover, our findings are consistent with **Fisher et al. (2012)** who concluded that Mindfulness-based interventions showed promise in addressing a series of psychological outcomes, including antenatal depression and anxiety, as well as empowering and satisfying labor for pregnant women.

The findings of the present study illustrated that there was no significant variation in mean anxiety scores concerning worries about bearing handicapped children between the experimental and control groups (p value ≥ 0.05). This might have been attributed to the contentment both groups felt after labor, knowing that their children were free from any obvious physical problems.

The findings of the present study showed that a significant differences in the observe, non-react and non-judge subscales among the intervention and the control groups, with a particularly significant difference in describe subscale having been noted between both groups. These findings consistent with a randomized controlled trial conducted by **Lönnerberg et al. (2019)** investigated the effects of a MBCP program on pregnant women's perceived stress and risk of perinatal depression. Accordingly, the aforementioned research reported that participants randomized to the MBCP program reported significantly larger reductions in perceived stress and depressive symptoms compared to those randomized to active control treatment (Lamaze). Those who participated in the program also reported a significantly larger increase in positive states of mind and mindfulness assessed using The Five Facet Mindfulness Questionnaire (FFMQ).

Findings presented in the current study also revealed an increase in mindfulness scores in the intervention group after mindfulness implementation. This finding is agreement with a Randomized Control Trial (RCT) by **Pan et al. (2019)** who assessed the effectiveness of MBPs on mental health during pregnancy and early motherhood. Notably, the mentioned study reported that mean The Five Facet Mindfulness Questionnaire

(FFMQ) scores in the intervention group increased by 9.29 between the pretest as well as a posttest.

The current study further showed that there was progress in The Five Facet Mindfulness Questionnaire (FFMQ) FFMQ scores of certain subscales (non-judge and describe subscales) in both groups, that yield the question of whether the ordinary intervention also caused an enhancement in mindfulness or whether pregnancy in itself promoted alterations, that increased mindfulness as gestation progressed.

The current study findings presented a significant difference in analgesic use between both groups, which may be attributed to participants' knowledge on the need and appropriateness of labor pain management through medication. Moreover, participants were unaware of the adverse effect of analgesics during labor on newborns, particularly raises the self-destructive behaviors and risk of addictive later in life. This finding is consistent with a Randomized Control Trial that actively investigated the benefits of preparing for childbirth with mindfulness training (**Duncan et al., 2017**). The mentioned study showed that the rate of narcotic use was 30.8% (n = 4) in the mindfulness training group and 61.5% (n = 8) in the control group. Despite this very large risk ratio (RR =.50), the difference did not quite reach statistical significance.

Moreover, the findings are inconsistent with another meta-analysis of 48 published RCTs (**Bricker & Lavender, 2002**) who examined the use of parenteral opioids for labor pain relief. The aforementioned study reported that only 15% included data for opioid safety outcomes, highlighting the potential to cause negative effects in newborns as well as a link between fetal exposure to opioids during labor and the risk of self-destructive behaviors and addictive later in life.

The finding presented herein; however, disagree with a single-arm pilot study on the effectiveness of a mindfulness-based childbirth education intervention on maternal self-efficacy and fear of childbirth conducted in an Australian community setting (**Byrne et al., 2013**). Accordingly, the mentioned study reported that systemic opioids commonly used for labor analgesia have side effects that can negatively impact the fetus, suggesting the need for lowering the rates of opioid analgesia. This trend may have been realized through better labor pain coping among those who participated in mindfulness training. However, we were unable to collect real-world data from the labor experience to examine this potential mechanism. Mindfulness training program can be used as a childbirth preparation approach that complements pharmacologic strategies for labor pain management, which have variable efficacy, produce

potentially harmful side effects, and may be undesirable for some women.

Moreover, the finding presented herein disagree with that reported by **Zilcha-Mano (2017)** who studied the effects of Western and Eastern perspectives of mindfulness-based interventions during pregnancy on birth outcomes, maternal physical health, and maternal mental health. The mentioned study showed that several pregnant women desired to refrain from pharmaceutical approaches when dealing with pregnancy-related health complications due to fears of harmful effects on the fetus. This has caused an increase in the alternative, non-medical, effective stress reduction measures, such as mindfulness practices.

The present findings revealed no significant differences in the mode of delivery between both groups. This could have been due to there was no cultural differences and the fact that participants were primigravida and multigravida with prior caesarian section. The findings is agreed with the results by **Smith et al. (2018)** who examined the effects of mind-body relaxation techniques for pain management in labor on maternal and neonatal well-being during and after labor using the Cochrane database of systematic reviews. Notably, the aforementioned study found that the effects of relaxation on the mode of birth remained unclear (very low-quality evidence).

Moreover, our findings are consistent with that presented by **Duncan et al. (2017)**, who found that a single mindfulness trial promoted no statistically significant difference between both groups and that no strong evidence showing differences in effects between those who underwent cesarean section and assisted vaginal birth.

However, this disagrees with a RCT conducted in midwifery settings in the Netherlands by **Veringa et al. (2021)**, who investigate whether MBCP or enhanced care as usual for expectant couples decreased fear of childbirth (FOC) and non-urgent obstetric interventions during labor and improved newborn outcomes. Notably, the aforementioned study found that participants from the mindfulness group had 36% less frequent epidural anesthesia compared to the control group and 51% fewer non-medically urgent cesarean births.

The present study findings are similar to the study by **Hulsbosch et al., (2021)** who conducted in the south of the Netherlands, which examined whether trait mindfulness during pregnancy was associated with antenatal breastfeeding intention. The mentioned study suggested that trait mindfulness during pregnancy was significantly associated with antenatal breastfeeding intention and initiation. Additionally, research conducted by **Van et al. (2019)** found that

mindfulness was associated with success in managing stressors accompanying motherhood and improved bonding, which contribute to the reduce probability of postpartum depression. . Also our findings are also consistent with **Hughes et al. (2009)** who investigated the effects of mindfulness approaches on childbirth and parenting. MBIs have been speculated to improve early parent–infant interactions by increasing parents’ ability to attend to their infants without becoming preoccupied with negative or self-critical thoughts, and which may help women relate to pain differently and therefore reduce anxiety associated with childbirth.

The present study illustrated that 9.80% and 34.10% of the complications occurring during delivery did so in the intervention and control groups, respectively. This may be attributed to the utilization of mindfulness practices to cope with worry and strengthen the mother-fetus relationship while also generating a more prosperous environment for the fetus in utero. The combination of a better environment for the fetus in utero and a calmer psychological space for the mother has been found to facilitate a more painless labor and delivery process. That results is agreed with that presented in a randomized controlled trial conducted by **Zarenejad et al. (2020)** in Abyek city of Qazvin province, Iran, which assessed the effects of mindfulness based stress reduction on maternal anxiety and self-efficacy. That mentioned results suggested that health care providers and pregnant mothers can undergo mindfulness programs to alleviate maternal anxiety and improve and delivery and pregnancy outcomes.

The current findings also agree with a RCT performed at Udonthani Hospital in Northeast Thailand (**Sriboonpimsuay, 2011**), which examined the effects of meditation on preterm birth prevention. Notably, the mentioned study revealed that the meditation group had significantly lower preterm birth rates compared to the control group (6.0% vs. 15.7%, $P = 0.037$).

The findings showed that 4.90% and 31.70% of the participants in the intervention and control groups experienced neonatal health problems after the intervention. These may have been related to the synergistic relationship between the mother and the child and the favorable effects of mindfulness on maternal neuroplasticity.

A literature review conducted by **Van et al. (2019)** to determine the impacts of mindfulness and yoga practice upon birth outcomes and maternal health revealed findings consistent with that presented herein. Notably, the mentioned study showed that mindfulness and yoga practiced regularly in the antenatal period can significantly improve birth outcomes for pregnant women and babies.

Enhancement birth outcomes for the babies included raised birth weight resulting from decrease incidence of intrauterine growth restriction and premature birth.

This study found that the mindfulness training program had positive effects on the intervention group regarding the findings presented in level of anxiety, which decreased across all subscales (fear of giving birth, Worries about bearing handicapped child and own appearance) ($B = -4.25$). Moreover, all subscales of the FFMQ increased by about ($B = 9.08$) after the intervention. These findings are consistent with that presented in a study entitled “Mindful pregnancy and childbirth: effects of a mindfulness-based intervention on women’s psychological distress and well-being in the perinatal period” (**Dunn et al., 2012**), which showed that participants reported a decline in measures of stress, anxiety, and depression, with these advancements lasting to the postnatal period. The current study also observed increases in mindfulness and self-compassion scores over time, similar to that found in previously mentioned studies, which showed that mindfulness training during the perinatal period reduced the negative effect and state anxiety (**Vieten & Astin, 2008**), pregnancy anxiety, and improved mindfulness (**Duncan & Bardacke, 2009**).

Finally, the virtual mindfulness interventions encouraged acceptance of one's ideas, emotions, and physical sensations, which helped build stress tolerance, reduce reactivity, also avoid annoying experiences, all of which were important in the perinatal period.

Conclusion

Virtual mindfulness had apposite influence on decreasing level of anxiety, enhancing mindfulness and improving labor outcomes among pregnant women in intervention group in relation to control group post intervention additionally reduced fears that occur during labor and after delivery.

Recommendations

Further studies on mindfulness after labor are needed to clarify its effect. Moreover, concerning nursing practice, nurses are required to have the knowledge and information about mindfulness therapy to provide psychological support to pregnant women, increase awareness, and reduce anxiety.

Limitations

Among limitations related to the current study was the difficulty in recruiting participants for the virtual mindfulness training program. In fact, due to shortage of time, schedule conflicts, and childcare concerns, the overwhelming of women approached during recruiting were unwilling to share in the mindfulness intervention and unfamiliarity toward the researcher.

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