

Original Article

## The effectiveness of educating mindfulness on anxiety, fear of delivery, pain catastrophizing and selecting caesarian section as the delivery method among nulliparous pregnant women

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ABSTRACT

**Background & Aim:** To decrease the rate of caesarean section, complicated intervention for changing behaviors are required. The present study was conducted to evaluate the effectiveness of mindfulness education on anxiety, fear of delivery, pain catastrophizing, and selecting caesarean section as the delivery method among nulliparous pregnant women who referred to Ziaeian Hospital.

**Methods & Materials:** This clinical trial study was conducted on 38 eligible nulliparous pregnant women who referred to the prenatal clinic of Ziaeian Hospital during the time of the study and candidates for caesarean section. Participants were allocated into two groups of 19. The control only participated in childbirth preparation classes, but the intervention group, also participated in 8 mindful childbirth educating sessions based on the educational method of Nancy Bardacke. Data collection tools were Hartman's Childbirth Attitudes Questionnaire, Spielberger's State-Trait Anxiety Inventory and Pain Catastrophizing Scale. Data were analyzed using SPSS software and independent t-test, Chi square test, Fisher's Exact test and covariance analysis.

**Results:** Results of the study showed significant difference between the two studied groups after the intervention regarding their scores of anxiety, fear of delivery, and pain catastrophizing ( $p < 0.05$ ), that was still statistically significant after adjusting the pre-intervention scores ( $p < 0.05$ ). Also the number of pregnant women who selecting caesarean section as significantly lower in the intervention group ( $p < 0.05$ ). In the intervention group, the rate of selecting caesarean section as the method of delivery ( $p < 0.001$ ), and the scores of anxiety, fear of delivery, and pain catastrophizing ( $p < 0.05$ ) was significantly reduced after the intervention compared to before the intervention.

**Conclusion:** Considering the primary efficacy of mindfulness education in this study and the mental, biological and social challenges related to pregnancy and delivery and also, relevantly, low attention to the stress preventive programs and cognitive/behavioral issues of pregnancy and its effects on selecting the type of delivery, Health Ministry could use this program as a supplement for delivery preparation classes.

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### Introduction

Caesarean section, as a delivery method with defined indications, has allocated a percentage of deliveries to itself all around the world. The prevalence of caesarean section has increased globally during the

past years in a way that 4.5% in 1970 has been increase to 38% in 2007. The rate of caesarean section has been increased from 13.8% in 1993 to 17% in 1997 in England and from 5.7% to 20.7% in Turkey (1). The rate of caesarean section has been increased in Iran up to 45.4% (2). The economic load and diseases related to caesarean has always been higher than vaginal delivery; meaning that performing this surgery has always had many complications for the mother and the fetus. Some of these complications are complications of anesthesia, hemorrhage,

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embolism, post-operative infections and higher rate of maternal mortality, which these factors, altogether, other than causing physical and mental problems for the mother, would double or triple the costs of delivery for the family. Also mother's inability after caesarean section, would lead to mother's lack of attention toward her infant after birth and incorrect breastfeeding (3).

The rate of caesarean in every country is one of the indexes for evaluating the performance of maternal health programs. Increased number of unnecessary caesarean sections indicates inappropriate performance of country's health system. World Health Organization has recommended the maximum rate of caesarean sections based on realistic and practical indications to be 15% but according to the reported statistics of the maternal health office of the Ministry of Health, this rate in our country has reached 45.4%. Higher prevalence of 45% has put us among the countries with high risk of caesarean section deliveries. Therefore, the increased rate of caesarean, not just in Iran, but in the entire world, is considered as a health problem (4).

Promoting vaginal delivery program, which is one of the instructions of Health System reform Plan, has been performed in hospitals of Iran to improve the maternal and neonatal health. According to this plan, all of the hospitals are required to reduce the rate of performed caesarean sections. For encouraging mothers to perform vaginal delivery and reduce their delivery costs vaginal deliveries are being performed at all the public hospitals for free and patients are not required to pay for vaginal deliveries. Furthermore, to maintain mothers' privacy and making vaginal delivery a pleasant process for the mother, optimization of the physical environment of delivery units are also regarded. Encouraging public centers and services providers to provide methods of

reducing labor pain including medicinal and non-medicinal methods, is another conducted measure in this regard. Another measure of the vaginal delivery promotion program is to promote the natural process of pregnancy and delivery through childbirth preparation classes for pregnant mothers and empowering service providers (5).

But despite all the effort for executing this program that has been started from May 5<sup>th</sup> 2014, the rate of caesarean section is still high in the country and the most important factor for this increased rate is non-medicinal and due to mothers' requests (6). Results about the reasons for mothers' requests for caesarean section as the selected method for delivery indicated that most of the mothers (71%) request for delivery due to unjustified reasons and unawareness, wrong beliefs and behaviors and untested approaches are the determinants of the type of delivery (7). Since childbirth is one of the sweetest moments in the life of the parents, one of the most important issues that must be considered is selecting the method of childbirth. It is every mother's right to choose the method of giving birth to her child; choosing is one of the human rights but it must be based on science and knowledge (8).

The maternal health office of the Ministry of Health believed that fear of severe and unbearable pain of vaginal delivery, its caused anxiety and pain catastrophizing are also related to the maternal reasons for choosing caesarean section (9). Murray has mentioned that for being successful in reaching the optimized rate of caesarean section, all of the medical, psychological and social aspects must be regarded (10). Since the general health policy of the country is toward reducing the rate of caesarean section and preventing its elective performance, besides the planned measures of the promotion of vaginal delivery program, it seems effective to use

educational methods based on recognition and management of problem-solving and empowerment of pregnant mothers; because when people encounter fear, anxiety and catastrophic thoughts about pain, coping strategies would be reduced and the anxiety level would be increased. This anxiety would lead to a vicious cycle and eventually would lead to not making the right choice. The study of Ghafari et al showed that by increasing the women's perception of their own abilities to cope with obstacles, such as labor pain, the rate of vaginal delivery could be increased (11). Also the study of Mardi et al revealed that proper education during pregnancy could be effective in reducing the rate of elective and with no medical reasons caesarean sections (12). Therefore, educating techniques that could increase individual's knowledge about the experiences of the current moment and restoring focus on the cognitive system would seem effective in decreasing individual's anxiety and physiologic tension and helping pregnant mothers to live the moment and experience more self-esteem and better welfare during this normal period of their lives.

One of the coping strategies is mindfulness skill. The reason for choosing this method is that it would provide a different approach for coping with emotions, anxiety, fear of pain and distress; it is assumed that not relating to negative thinking is associated with a skill which would prevent the individual from rumination (13). The main principle of this method is that, by realizing the true nature of the thoughts and desires, the client would learn to control and manage fear and anxiety and, in turn, it would allow the client to inhibit their behavioral responses more effectively. Furthermore, the aim of this program was to improve the effect of stress related to pregnancy and delivery challenges using mindfulness meditation practice. MBCP program has

recommended that parents would consider the transitional period of pregnancy and delivery as an opportunity for learning the methods of mindfulness so that this important period of pregnancy and delivery would be used for learning life skill based on methods of mindfulness to cope with the pain and fear, which is a normal part of this travel to the unknowns, more desirably (14, 15).

The evidences and previous literature also have proven the useful effects of educating mindfulness on health and have indicated that mindful people are more capable in recognition, management and solving the problems of daily living (16). The effective results of delivery and parenting education based on mindfulness on reducing pregnancy anxiety, perceived stress and pregnant women's negative emotions in the study of Sarabandi et al (14), and also not finding any conducted studies in Iran about the effect of mindfulness on caesarean section, made the researcher to evaluate the effect of mindfulness education on reducing elective caesarean section among nulliparous pregnant women who referred to Ziaeian hospital; may be the results of the present study could be helpful in reducing the rate of elective caesarean sections.

## **Methods**

The present study was a pre-test post-test controlled single-blind clinical trial. Resrarch population included all of the nulliparous pregnant women who referred to the prenatal clinic of Ziaeian hospital from June to November 2016.

Samples were selected through convenient method by the researcher's referral to the center everyday constantly; so that 758 pregnant nulliparous women received a questionnaire about their decision for the type of the delivery. Those who have selected vaginal delivery or not decided yet

were not enrolled in the study. From 150 caesarean section candidates who had the inclusion criteria, 38 with higher than the median score of fear and anxiety were selected and randomly allocated into two groups of intervention (19 participants) and control (19 participants). In this single-blind study, mothers were not aware of their allocated group. The allocation and follow-up methods for the present study are shown in figure 1.

Ziaei hospital was selected as the research environment because delivery preparation classes are held at this center regularly and it has an appropriate physical space for holding mindfulness education sessions (carpeted hall for performing seated and lying exercises). Also, most of the clients of this hospital were living near the hospital which put them in the same economic social and cultural level. The inclusion criteria were being pregnant and candidate for caesarean section, having a fear and anxiety score of higher than the cut-off point, being of Iranian nationality, being nulliparous, having a gestational age of 18 to 28 weeks, and having singleton pregnancy. The exclusion criteria were the need for consuming psychiatric medications (using antidepressant, anti-anxiety and antipsychotic drugs), having a risky pregnancy and not participating in the sessions completely.

Data gathering tools for this study were three questionnaires of Spielberger's State-Trait Anxiety Inventory, Hartman's Childbirth Attitudes Questionnaire, and Pain Catastrophizing Scale.

1- Spielberger's State-Trait Anxiety Inventory includes interpretive criteria the state and trait anxiety scales. State-Trait Anxiety Inventory has been designed to evaluate adults' anxiety and contains two subscales. In this scale the state of anxiety and the trait of anxiety are distinguished from each other. This scale includes 20 items for evaluating

the state of anxiety and 20 items for evaluating the trait of anxiety that have been designed as positive and negative. For evaluating the state of anxiety, the participant would indicate their current feeling of anxiety with a four-point scale. Questions number 2, 5, 10, 11, 15, 16, 18, 19, and 20 are scored in reverse. For evaluating the trait of anxiety, the score of 20 to 31 is considered mild anxiety, 32 to 42 is considered moderate anxiety, 43 to 53 is considered moderate to high, 54 to 64 is relatively high anxiety, 65 to 75 is severe anxiety and 76 to 80 indicates very severe anxiety. The internal consistency of the State-Trait Inventory is relatively high. The mean of its coefficients for different groups in the state of anxiety scale is reported as 0.92 and in the trait of anxiety scale is reported as 0.90. In Iran, Panahi Shahri calculated the coefficient of the state of the anxiety scale as 0.84 and of the trait of the anxiety scale as 0.76, using test retest method (17).

2- Hartman's Childbirth Attitudes Questionnaire for evaluating fear of delivery which has been reviewed by Lowe (18). This questionnaire includes 14 questions based on four-point Likert scale (never, rarely, moderate, and a lot). The range of its score is from 14 to 56. The middle score of 28 is considered as fear of delivery. The reliability of this questionnaire has been approved with a Cronbach's  $\alpha$  of 0.83 (19). In Iran, its reliability and content validity has been approved with a Cronbach's  $\alpha$  of 0.85 (20).

Pain Catastrophizing Scale has been designed to evaluate different aspects of pain catastrophizing. It includes 13 questions and answers would be categorized into three groups based on three scales of rumination, exaggeration and frustration. The participants would ask to choose a

number from 0 (never) to 4 (always) for expressing the frequency of 13 different feelings and thoughts related to the experience of pain. The middle score of 26 is considered as the cut-off point. Sullivan et al approved its reliability with a Cronbach's  $\alpha$  of 0.88 for rumination subscale, 0.67 for exaggeration and 0.89 for frustration and 0.92 for the entire scale (21). The reliability of the mentioned scale has been approved in Iran (22). Delivery training program is based on Nancy Bardacke's mindfulness model and the MBSR program which has been designed by Mrs. Sarabandi et al according to the Iranian culture. This program includes nine 1.5-hour sessions; one of the sessions is named the silence session and would be held after the 6<sup>th</sup> session and is not counted as one of the main sessions and is mostly considered as an exercise. At each of the sessions of MBCP program, mindfulness meditation would be taught. Also the

participants were asked to repeat the meditation exercises according to the distributed pamphlets for 30 minutes per day 6 days a week. Mindfulness education is completely competence with the current knowledge of psychobiological processes of pregnancy period, delivery, post-partum period and breastfeeding. This program contains various strategies for coping with psychical and psychological labor pain and also awareness skills for coping with daily living stress based on the trainings of MBCP program. Delivery preparation program is focused on mindfulness and participants' commitment to perform all of the homework. Besides training mindfulness exercises, the necessary element of these sessions is encouraging the sense of sharing among pregnant parents to reduce the negative effect of post-partum social isolation on the mental health of new parents (14) (Table 1).

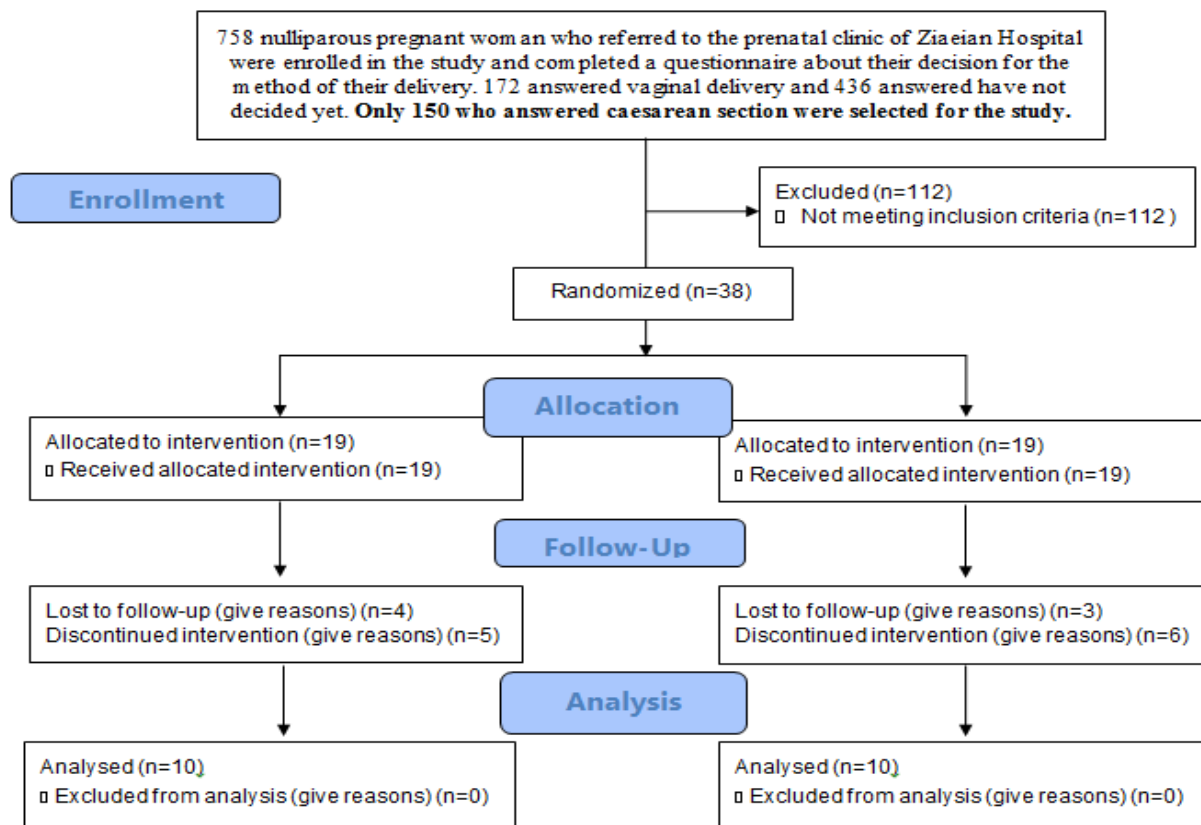


Figure 1. The flowchart for selection, allocation and follow up of participants

**Table 1.** The guideline for mindfulness-based delivery and parenting trainings

Sessions	Sessions' content
1 <sup>st</sup> & 2 <sup>nd</sup>	Greeting, explaining about mindfulness-based delivery and parenting trainings, presenting subjects that are common throughout the entire course, presenting the definition of mindfulness, expressing the relation between stress and changes, expressing the reason for group training, conscious breathing, exercising accompanying the child, meditation by eating raisin, meeting, physical examination, conscious breathing while seated, explaining the homework.
3 <sup>rd</sup> & 4 <sup>th</sup>	Three minutes of conscious breathing and exercising accompanying the child, reviewing homework, exercising fear and pain, yoga, breathing the duration of pain tolerance, explain the homework.
5 <sup>th</sup> & 6 <sup>th</sup>	Training yoga, pain acceptance, explaining the process of delivery, exercising accompanying the child, hearing about and reviewing the homework, expressing fears and joys, explaining the homework.
Meditation exercise	This session had no new exercise and previous exercises were reviewed at this session. The aim of conducting this session was that having lingered exercises before delivery would lead to better preparation for delivery.
7 <sup>th</sup> & 8 <sup>th</sup>	Reviewing the activities that were conducted after the previous session, seated meditation, love meditation, exercising love, explaining the physiologic relation between breastfeeding and mindfulness, encouraging the participants to continue the exercises of mindfulness until the time of their child's birth and even afterwards.

After taking informed consent from the participants and physician's permission for participation in the sessions, educational sessions were started. In the intervention group, after each delivery preparation class, Nancy Bardacke's mindfulness model was educated and the participants of the intervention group received a total of nine sessions of mindfulness education besides the delivery preparation classes. Also, the intervention group included 25 pregnant women who were recommended to bring someone as a support at predetermined sessions. The control group also included 25 pregnant women who participated in delivery preparation program and received no psychological education. Both groups completed the delivery method decision questionnaire before the intervention; after being selected as eligible participants and allocation into the groups (19 participants in each group), participants completed the questionnaires about the research variables. Two weeks after the end of the classes, all of the participants, from the intervention and the control groups (19 participants in each group), completed the questionnaires again. Considering the ethical issues, the aims and the methods of the study were explained to all of the participants at the beginning of the study. Then written informed consent was obtained from all the participants for

voluntarily participation in the study. Participants were ensured that they could leave the study at any desired time, their gathered information would remain confidential and the results of the research would publicly be reported. This study was approved by the ethics committee of the Science and Research University under the code IR.IAU.SRB.REC.1395.17. The present study was registered at Iranian Registry of Clinical Trials by No. IRCT2015111625066N1.

Gathered data were analyzed using SPSS 19. To describe the personal-social characteristics of the participants descriptive statistics (number/percent, mean and standard deviation) were used. To evaluate the frequency of the underlying variables in both groups before the intervention, independent t-test, Chi square test and Fisher's exact test were used. Covariance analysis was used to evaluate the mean scores of anxiety, fear of delivery and catastrophizing pain after eliminating the effect of pre-test. The significant level was set 0.05 for all the statistics tests.

## Results

The mean age of participants in the intervention group was  $28.27 \pm 4.78$  years and in the control group was  $28.21 \pm 4.57$ .

In the intervention group 28% of the participants had a master's degree and 3% had diploma and the most common educational level in both groups was bachelor's degree (37%). The mean of gestational age in the intervention group was 27 weeks and in the control group was 27 weeks and 5 days. Participants had similar economic status and financial income. Table 2 represents the demographic characteristics of both groups. Chi square test and independent t-test showed that no significant difference existed between both groups regarding their demographic characteristics; in other words, the groups were similar ( $p > 0.05$ ).

Comparing the mean scores showed that the mean and standard deviation of the scores of anxiety, fear of labor pain and catastrophizing pain had no significant difference between both groups before the intervention ( $p > 0.05$ ); but after the

intervention, the scores of the intervention group was significantly reduced compared to the control group ( $p < 0.05$ ). The intervention decreased the scores of anxiety, catastrophizing pain and fear of labor pain in the intervention group significantly compared to the control group. Single-variable covariance analysis was used to evaluate the meaningfulness of differences in the scores of anxiety, fear of labor pain and catastrophizing pain after the intervention between both groups (intervention and control). Covariance analysis between groups showed a significant difference between the intervention and the control group in the score of anxiety after the intervention ( $p < 0.004$ ). Also the scores of fear of labor pain ( $p < 0.0001$ ) and catastrophizing pain ( $p < 0.0001$ ) had a significant difference between both groups after the intervention (Table 3).

**Table 2.** Demographic characteristics of the pregnant women of the control and the intervention groups who referred to the prenatal clinic of Ziaieian Hospital in 201

Variable	Control (n = 19)	Intervention (n= 19)	P value
Age (years)	28.21 ± 4.57	28.27 ± 4.78	0.08
Gestational age	27 ± 2.7 weeks	27 ± 2.5	0.06
Educational level	Diploma	2 (10.5%)	0.07
	Associate's degree	6 (31.5%)	
	Bachelor's degree	7 (37%)	
	Master's Degree	4 (21%)	

**Table 3.** Comparing the mean and standard deviation of the scores of anxiety, fear of labor pain and catastrophizing pain before and after the intervention between the intervention and the control groups among nulliparous pregnant women who referred to the

Variable	Before (n = 19)		P value	After (n = 19)		P value
	Intervention	Control		Intervention	Control	
Anxiety	88.84	88.16	> 0.665*	81.26	85.42	< 0.05* < 0.004**
	± 4.69	± 4.95		± 3.54	± 4.69	
Fear of labor pain	42.72	43	> 0.788*	26.95	36.74	< 0.0* < 0.001**
	± 3.34	± 2.60		± 3.53	± 4.28	
Catastrophizing pain	22.53	24.16 ±	> 0.406*	15.37	20.26	< 0.05* < 0.001**
	± 6.23	5.27		± 3.37	± 3.39	

\*independent T-Test,\*\* Covariance analysis to eliminate the effect of pre-test

prenatal clinic of Zioeian Hospital in 2015

**Table 4.** Comparing the selected method of delivery between the intervention and the control group before and after the intervention among nulliparous pregnant women who referred to the prenatal clinic of Zioeian Hospital in 2015

The selected method of delivery	Control group	Intervention group	Fisher's exact test
Vaginal	4	15	P < 0.001
Caesarean	15	4	
Total	19	19	

Evaluating the results of mother's decision about the type of delivery in both groups after the intervention showed that, although all of the participants were candidates for caesarean section before the intervention, but table 4 indicates a significant difference between both groups regarding the decrease in selecting caesarean section as the method of delivery ( $p < 0.001$ ).

## Discussion

The present study was conducted to evaluate the effect of mindfulness training on decreasing anxiety, fear of labor pain and catastrophizing pain in selecting caesarean section as the method of delivery among nulliparous pregnant women. Results of the present study showed that mindfulness education improved the score of anxiety, fear of labor pain and catastrophizing pain and consequently changed the attitude toward selecting caesarean section.

These results are in line with the study of Byrne et al who evaluated the effectiveness of mindfulness education on fear of delivery and showed that mindfulness education was associated with increased level of pregnant women's control and self-confidence at the time of delivery. Byrne statistically revealed that 12 pregnant mothers who received mindfulness education based on the standard protocol had significant advancements and huge self-efficacy in the quality of delivery and decreased fear of delivery (23).

Fenwick et al in a study evaluated the efficacy of a psycho-educational counseling provided by a midwife (about the emotions at the time of delivery and improving expected fears). Compared to the control group, pregnant women who received this education experienced lower levels of anxiety and fear near and at the time of term delivery (24). This study also had similar results to the present study.

According to the results of the present study, the rate of selecting caesarean section as the method of delivery had a significant relation with fear of delivery, in a way that mothers who had fear scores higher than the cut-off point were selected caesarean section as their method of delivery. This result was in line with the results of Khorsandi et al who believed in the primary role of fear of delivery in selecting caesarean and also the effect of fear on the occurrence of negative effects of delivery and emergency caesarean section (20).

Also, according to the maternal health office of the Health Ministry, among the maternal factors which are related to the increased requests for caesarean section, fear of the great and overwhelming labor pain is the most important factor. Intense fear of delivery and anticipating pain and stress during the delivery would increase the possibility of emergency caesarean and unnecessary requests for caesarean by mothers (9). Results of the study by Ryding et al are also similar to the last mentioned study and believed that to decrease the fear



of delivery among pregnant mothers, psychotherapy and educating different methods of body relaxation could be used during delivery preparation classes (25).

Also, results of the present study showed a significant difference in the score of catastrophizing pain in the intervention group after the intervention compared to before the intervention and also compared to the control group. Catastrophizing pain is one of the strongest psychological factors in predicting the experience of pain and it is associated with increased pain, anxiety, distress, emotional processes and also disability (26). Catastrophizing pain in delivery, could be a threat source for women, which would intensify catastrophic thoughts; exaggerated thoughts about pain and underestimation of self-abilities to cope with pain could lead to choosing caesarean section as the method of delivery (27).

In the present study, before the intervention all of the participants were candidates for caesarean section and results indicated that an attitude change occurred both in the control group, insignificantly ( $p > 0.125$ ), who received just the trainings of the delivery preparation classes and the intervention group, significantly ( $p < 0.001$ ), who received mindfulness education along with delivery preparation classes; this reveals the importance of education for pregnant mothers and confirms the effectiveness mindfulness education as a supplement for routine preparation for delivery classes. This result was in line with the results of Najafi et al which found that preparation for delivery classes are effective on decreasing fear of delivery and increasing the possibility of vaginal delivery (28).

By reviewing the results of the present study it could be concluded that delivery education programs based on mindfulness training could be effective decreasing delivery anxiety, fear of labor, catastrophizing pain and eventually

choosing caesarean section as the method of delivery. According to the results, mindfulness-based education could have major role in decreasing the problems of pregnancy period which have a decisive role in mother's and infant's health. Considering that, it is better to limit the consumption of psychiatric drugs during pregnancy, it seems that using this type of programs could provide mother's and infant's health.

Mindfulness would help mothers to prepare themselves for delivery, overcome their fear and anxiety of delivery and would also decrease the risk of complications after delivery. During the mindfulness education, participants are allowed to express their fears especially during pregnancy and delivery, and would not be judged for them; instead they would become aware of their own fears so that they would find solutions for overcoming these fears and at this time, by practicing mindfulness exercises, they would find the answer in having a conscious mind.

Originally, mindfulness education is designed for pregnant women along with their partners, but considering the limitations of the Iranian society, it was not possible for the husbands to participate in classes where physical exercises were performed. It is recommended that in these cases, separate sessions for husbands would be held or along with group sessions, private sessions for the couples would also be conducted so that the husbands would become more aware of this educational program. Since no separate place existed outside the hospital for conducting the sessions, all of the participants were selected from the patients of one center and it was not possible to conduct sampling at other centers too. It is recommended to assign special centers for these educational programs so that selecting more samples with more varieties would become possible. Since it was possible that the participants would go into labor at any

time, the post intervention evaluation had to be conducted only two weeks after the intervention; this was another limitation of working with pregnant women.

Considering that pregnancy is an important period in women's life, to regard the welfare and health of pregnant women and their husbands, it seems that this educational program could be conducted for all of the pregnant women. For better recognition of related factors to the decision for selecting the method of delivery in pregnant women and to achieve their perspectives, and also the effective role of the individual, family, relatives and social factor on selecting the method of delivery, more studies should be conducted. In the present study, the main emphasis was on the individual and her empowerment so that while evaluating the effective therapeutic methods on these variables, elegant and sophisticated relations were observed between mindfulness and its effect on the mentioned variables. According to the results of the present study, mindfulness was effective on decreasing anxiety, fear of labor pain and catastrophizing pain.

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### **Conflict of Interest**

The authors declare that they have no conflicts of interest

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