

# The Effect of Non-Pharmaceutical Methods of Labor Pain Relief on Mothers' Postpartum Depression: A Randomized Controlled Trial

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## Abstract

**Objectives:** The prevalence of postpartum depression in Iran is about three times of the developed countries. This study is done for investigating the effect of non-pharmacological methods of pain relief in labor on postpartum depression.

**Materials and Methods:** This is a controlled double-blinded random clinical trial in which 320 referred women were allocated to two intervening group (158 women) and control group (162 women) as random blocking. In the intervening group non-pharmacological methods of pain relief in labor was used. Edinburgh questionnaire was used in two stages for assessing depression: first stage before active phase onset, the second phase was eight weeks after delivery. General linear model was used for analyzing data.

**Results:** Mean (standard deviation) of prenatal depression in the intervening group was 6.1 (3.2) and in the control group it was 6.3 (3.2), which does not show statistically significant difference between the two groups ( $P=0.610$ ). Mean (standard deviation) of depression at eight weeks postpartum in the intervening group was 7.9 (4.6) and it was 8.9 (5.4) in the control group.

**Conclusion:** Having controlled the prenatal depression grades, there was no statistically significant difference between the two groups in postpartum depression. This shows the decrease of depression in the intervening group as compared to the control group which could be due to the effect of non-pharmacological methods of pain relief in labor.

**Keywords:** Pain, Relief, Labor, Postpartum Depression

## Introduction

Pregnancy and labor is a critical stage for women due to its mental pressure. There are ever-increasing evidences which show that the consequences of pregnancy and child's growth are affected by women's mental status in this duration. Mental illnesses affect the relationship of the women with the other family members.

Postpartum depression is one of the mental disorders related to pregnancy and postpartum (1). Postpartum depression is a non-mental depression which occurs during first six weeks after labor and its symptoms are similar to depression symptoms at other times. Depression at first month after labor is three times more than the average monthly occurrence among non-delivered women. Studies in different cultures show that prevalence of postpartum depression among teen mothers is 10-15% (2). The prevalence of postpartum pregnancy in all the studies ranges from 4.5 to 28% (3). In domestic studies, the prevalence of postpartum pregnancy is reported at 30% in North Tehran treatment centers (4), at 34.7% in Tabriz (5) and at 23.7% in Qom. The prevalence of postpartum depression in Iran follows the pattern of developing coun-

tries which is almost three times of the developed countries (6). In regard to the high prevalence of mental disorders among pregnant women, conducting research for identifying the reasons and developing effective treatment for mental disorders among pregnant women at postpartum stage, is essential (7).

Postpartum depression is defined with mood depression, reduced desire for activity, changing appetite, fatigue, sleep difficulties, difficulty in child care, feeling of guilt, low confidence, difficulty in concentrating, psychomotor pauses, mutability and suicidal thoughts (8). The most prevalent consequences include emotional and behavioral problems and cognitive delay among children of depressed mothers (9,10).

The predisposing factors of depression include mother's young age, smoking, severe vomiting at pregnancy, pregnancy depression, previous depression record, low confidence, physical diseases, weak social support, low social and economic levels, marital problems, unwanted pregnancy, life tragedies, pregnancy and delivery complications, multi-pregnancy, premature birth, and fear of child care (11).

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Most of the studies have reported significant relationship between types of labor with postpartum depression such that the prevalence of postpartum depression among cesarean mothers was more than mothers who had physiologic delivery (12-16). Nowadays, the number of midwifery surgeries and especially cesarean is increasing (17). Danger of maternal morbidity in optional cesarean is increased to 9 times as compared to 3 times in natural vaginal delivery. Meanwhile, maternal morbidity in cesarean delivery is 3 times the vaginal delivery (11).

One of the most prevalent reasons of mothers willingness for cesarean is fear from natural delivery pain (18) and pain control is one of the important parts of modern delivery cares (19). The main aim of care during labor is management of labor pain which is done via pharmacological and non-pharmacological methods. The pharmacological methods are effective in removing the physical feeling of pain, while non-pharmacological methods prevent the pain more efficiently.

Using pharmacological methods in pain relief of labor is considered as a dangerous factor and is usually accompanied by clinical complications and concerns related to each method. On the other hand, the high satisfaction that most women gain from non-pharmacological methods of pain relief in labor show that these methods probably have other benefits which are not known (20). Studies show that supportive and consultative education and actions at pregnancy with reducing the fear of labor has positive effect on the postpartum experience (21). Continuous support of midwife along with observing the principles of natural delivery reduces the intensity of labor pain and its duration remarkably (22) and is effective in prevention from postpartum depression (23). The study by Pilevarzadeh et al. showed that massage reduce pain and anxiety during labor and has positive effect on delivery experience (24). Another study showed that providing postpartum emotional and informatics support considerably reduces the postpartum depression (25).

Regarding the high prevalence of postpartum depression and its undesired complications as well as the benefits of non-pharmacological methods in pain relief of labor and lack of study in this area, the current study was done for determining the effect of non-pharmacological methods of pain relief in labor on postpartum depression among mothers referring to Alavi Training Clinical Center located in Ardebil.

### Materials and Methods

The current study is a random clinical trial that was done in Alavi Training Clinical Center located in Ardebil from Feb. 2012 to Nov. 2012 on 320 women who had the requirements for entering the study. They were randomly allocated in two intervening and control groups. According to the study by Zahraei et al. (25) the sample size of 160 was computed for any group having considered  $\alpha=0.05$ ,  $\beta=0.1$ ,  $M_1=12.6$ ,  $M_2=10.8$ ,  $SD_1=4.67$ ,  $SD_2=4.79$  and 10% loss.

The criteria for entering the study included a maternal age of 18-35 years old, Iranian nationality, residing in Ardebil province, being literate, a pregnancy age between 38 to 42 weeks, mono-pregnancy, embryo's being natural state, having low risk pregnancy, not taking special and unauthorized drugs, alcohol, smoking during pregnancy, not participating in training classes of physiological delivery during pregnancy, the mother's willingness for participating in research, acquiring grade less than 12 in Edinburg test, not having family depression record, not leaving the parents before 15 years of age, not having previous records of depression and anxiety and stressful life events within the past 6 to 12 months, not having interpersonal violence in past and present, not having infertility record, chronic illnesses and record of thyroid illnesses, hospitalized mothers in potential phase of labor or active phase with 4 cm dilatation and effacement below or equal to 50%.

The criteria for exiting the study include mother's relinquishment from continuing the intervention and not cooperating or refusing for participating in the research at any stage of study, any need for emergency intervention due to material or embryo reasons such as bleeding resulted from placental abruption, doing emergency cesarean for any reason during labor, trauma during delivery (using delivery tools like forceps or vacuum, wide perineal tear, bleeding after deliver, etc.) record of postpartum mother or child being hospitalized, and occurrence of stressful accidents until eight weeks after deliver.

The sequence of random allocation was determined via a computer program by one of the research team members not involved in choosing the samples and for allocation concealment, type of intervention was put in the opaque closed packets which were numbered in order. The qualified persons were allocated into two groups of 160 in intervention and control groups as random blocking method with size of 4 and 6 in blocks and as quota method based on number of deliveries (nulliparous and multiparous).

The available sampling method was first used for sampling, therefore, after the start of the research, having explained the aim of research and acquiring consent, the numbered pockets were opened for determining the type of intervention for the qualified mothers in order of mothers' referring. In this regard, the first pocket was opened for the first qualified person. For other samples, the related pocket was opened respectively and according to the type of intervention, mothers were allocated in one of the two groups.

For bias prevention, the interventions were done frequently in both groups of control and intervention by the first researcher and second researcher assistant. Therefore each of the researcher assistants used the pain relief method in labor once in the intervention group and then performed a traditional delivery.

In the intervention group, with the start of the active phase, establishment of silent setting and observing

mothers' privacy, non-pharmacological methods of pain relief in labor including showering, being in upright posture, aromatherapy with lavender, and soft music without words were used. For aromatherapy, oily essence produced by Barich Essence, Kashan Company (produced by distillation in 1.5% density from unopened flowers) was used. The manner of use was as follow: 1 ml solution of 20% lavender essence (20% of essence with 80% distilled water) was impregnated on a 10×10 cm cloth and attached to the mother's breast with the active phase starts.

In the intervention group, mother's vaginal examination during labor was done in active phase once in every two hours and at the second stage of labor, once in every 30 minutes. Oxytocin and amniotomy was not used for labor progress and labor progress was controlled based on partograph. For preventing from dehydration, mothers were persuaded to use oral fluids. As active phase started, Fetal Heart Rate (FHR) and cervical dilatation was checked for verifying the natural labor progress for 30 minutes and Non Stress Test (NST) was prepared for all mothers and attached to the mothers' files. Having given necessary training by researcher, the mothers were allowed to use hot water with hand shower whenever the felt comfort. All mothers stayed under shower for at least 20 minutes. In this duration, they were under supervision of the researcher. During the shower, the mothers were allowed to stand or sit on the chair as they wished and used swim cap from preventing their hair getting wet. After finishing showering, FHR and cervical dilatation were assessed for assessing the fetal health and labor progress. Then having attached the cloth impregnated with lavender essence and hearing classic relaxing music accompanied with natures sound, the researcher gave the necessary training to mothers for using the labor ball.

At least 30 minutes was considered for doing labor ball exercises. The intervention was as follows: the mothers sat on the labor ball while bending their knees at 90° and did pelvic movements back or front, right or left, up or below. Despite mothers' ability in keeping their balance on ball, the researcher attended as full-time supporter. Recording of the clinical examination was done at all stages by researcher to prevent bias. In the intervention group, supportive care was given to the mother during labor, delivery and 2 hours after delivery. These supports during labor included continuous attendance behind mother, her emotional and mental support, keeping mother's privacy, caring with respect, giving confidence and Oriflamme, giving correct information on labor progress, assisting in changing the status and putting her in proper positions, supplying the mother's needs and persuading her. The mothers were allowed to use water or filtered liquids if required. At delivery, the researcher continuously attended and gave necessary recommendations on the manner of cooperation during labor, manner of straining during contraction, persuading her to relax between contractions, assuring the mother about the health of the baby and the normal pro-

cess of the labor, and calming her.

After delivery, the infant was put on mother's abdomen and having established skin to skin contact and persuading the mother for patting the newborn, they tried to establish the primary connection. After cutting the cord, drying the infant and performing the primary actions, infant was placed in the arms of the mother. The mother was then persuaded to breastfeed her newborn. After removing the placenta, the necessary training and information was given to the mother about child care as well as their own care. Meanwhile during labor, the researcher had no intervention in the labor and acted as supportive by continuous attendance. In the control group, the interventions were customary according to delivery interventions. In the intervention group, there were no cases which required labor induction and augmentation and in both group there were no cases of dystocia during birth.

The questionnaires including individual-social particulars and delivery particulars and also Edinburg's questionnaire were used for gathering data. Edinburg's questionnaire has ten items each has 4 choices and according to response, zero to 3 points is allocated for each question. The minimum grade is zero and maximum one is 30. This questionnaire was prepared by Cox et al. in 1987. It is a suitable tool for screening which can lead to premature recognition of depression symptoms among mothers (26,27). Its Persian copy is a valid and reliable tool for diagnosing postpartum depression and the sensitivity, characteristics and its predictive value is verified (28,29).

Data were analyzed by SPSS ver.13 statistical software. Normality of quantitative data was studied by Skewness and Kurtosis and all had normal distribution. For studying the groups' homogeneity due to individual-social particulars, the Chi-square, process Chi-square, Fisher exact test and T independent test were used. For comparing the depression grade before intervention among the two groups, the T independent test and eight weeks later, the ANCOVA test was used upon controlling the grade effect before intervention.

## Results

Data from all randomized women were analyzed by intention to treat. From among 320 mothers who were allocated in groups, 14 were excluded from the study for variety of reasons (husband's death, infant's death, close relative's death, severe family dispute, cesarean, long-time hospitalization of infant, mother's hospitalization after delivery, husband's accident) (Figure 1). Regarding the social-individual particulars, there was no statistically significant difference between the two groups of intervention and control which shows the homology of groups. More than half of the participants in each of the groups (60 and 58% in the intervention and control groups, respectively) were in the age range of 20-30 years old. Most of mothers in both the groups (37.3 and 43.8% in the intervention and control groups, respectively) had high school certificate,

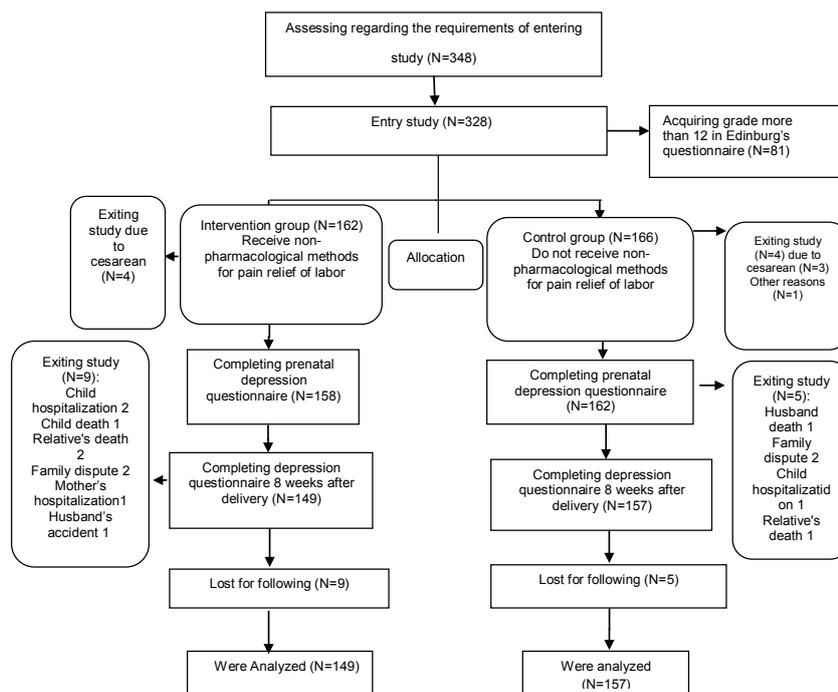


Figure 1. Flow chart of study

and were housewives (94.9 and 97.5% in the intervention and control groups, respectively). More than half of the mothers in both the two groups (60.8 and 67.3% in the intervention and control groups, respectively) had medium economic status (Table 1).

Mean (standard deviation) of prenatal depression in the intervention and control groups was 6.1(3.2) and 6.3(3.2), respectively (grade ranged in 0-30) and no statistically significant difference was seen between the two groups (P=0.610). Mean (standard deviation) of depression grade at eight weeks after delivery in the intervention group and control groups was 7.8 (4.6) and 8.8 (5.4), respectively. Although mean of depression grade in the intervention group (adjusted difference= 0.8, 95% confidence interval= 0.2 to 1.8) was less than control group, there was no statistically significant difference between two groups (P=0.124) (Table 2).

**Discussion**

Postpartum depression is a severe impairment which causes the women encounter a very difficult period. Premature recognition, proper and on time treatment is very vital for the health of affected women and their family (30).

The results of current study showed that using non-pharmacological method of pain relief in labor does not lead to significant reduction in mean of postpartum depression eight weeks after delivery, while mean grade among mothers in the intervention group was lower than mothers in the control group. In reviewing the related literature, no similar study was found studying the effect of non-pharmacological methods of pain relief in labor on postpartum depression.

The study done by Ajh et al. in the 3<sup>rd</sup> trimester of pregnancy on 440 pregnant women showed that supportive actions during pregnancy lead to significant reduction of postpartum depression. These supportive actions were given in three sessions to the mother which included anatomy training, physiology of pregnancy, readiness for delivery, training non-pharmacological method of pain relief in labor, exercises during pregnancy, lamaze exercises, providing educational booklets about postpartum physical and mental care and visiting the delivery room (23). The probable reason of such difference can be related to performing intervention or tools for measuring depression. In the current study, supportive actions and non-pharmacological methods of pain relief during labor and delivery were given.

The results of current study are consistent with that of Hodnett et al. In the study by Hodnett et al. which was done in North American hospitals on 6195 women, the mothers in the intervention group (3454 ones) were supported continuously by the special trained nurse during labor and mothers of control group (3461 ones) received customary care. There was no statistically significant difference between two groups 6-8 weeks after delivery regarding depression (31). Dennis in a reviewing study in 2005 studied 15 trials. These studies were done on 7697 women for evaluating the effect of preventive mental or social mental interventions on postpartum delivery among pregnant or postpartum women less than 6 weeks after delivery. The results showed that psychosocial supports or only psychological supports do not lead to significant reduction in number of women suffering from postpartum depression (32). Meanwhile Dennis in another study

**Table 1.** Individual-social and delivery particulars of subjects participating in the groups

Particulars	Intervention group (N=158)	Control group (N=162)	P-value
Age mean ( SD <sup>*</sup> )	4.8 (24.7)	4.8 (24.1)	0.740 <sup>**</sup>
Residing place			0.484 <sup>‡</sup>
Rural	53 (33.5)	61 (37.7)	
Urban	105 (66.5)	101 (62.3)	
Academic status			0.587 <sup>†</sup>
Elementary	23 (14.6)	25 (15.4)	
Middle	47 (29.7)	48 (29.6)	
High School	59 (37.3)	71 (43.8)	
University	29 (18.4)	18 (11.1)	
Occupation			0.253 <sup>‡</sup>
Housewife	150 (94.9)	158 (97.5)	
Employed	8 (5.1)	4 (2.5)	
Husband's age mean ( SD <sup>†</sup> )	29.4 (5.2)	29.2 (5.2)	0.996 <sup>**</sup>
Family's income sufficiency			0.390 <sup>†</sup>
Earning more than expense	46 (29.1)	42 (25.9)	
Earning equal to expense	96 (60.8)	109 (67.3)	
Earning less than expense	16 (10.1)	11 (6.8)	
Biomass (kg/m <sup>2</sup> ) mean ( SD <sup>*</sup> )	23.8 (3.7)	24.3 (4.7)	0.709 <sup>**</sup>
Wanting last pregnancy	142 (89.9)	122 (82.1)	0.054 <sup>‡</sup>
Number of pregnancy mean ( SD <sup>*</sup> )	1 (0.8)	1.7 (0.9)	0.543 <sup>**</sup>
Having abortion record	20 (12.7)	30 (18.5)	0.167 <sup>‡</sup>
Type of delivery			0.858 <sup>§</sup>
Vaginal with episiotomy	104 (65.8)	108(67.1)	
Vaginal without episiotomy	53 (33.5)	53(32.9)	
Vaginal with 1 <sup>st</sup> & 2 <sup>nd</sup> rank tear	33 (60)	26(49.1)	0.493 <sup>§</sup>
Placental automated exiting	157 (99.4)	159(98.8)	1.000 <sup>‡</sup>
Child's gender			0.655 <sup>‡</sup>
Boy	70(44.3)	76(46.9)	
Girl	88(55.7)	86(53.1)	
Child's Apgar			
First minute mean (SD <sup>*</sup> )	9 (0.1)	8.9 (0.6)	0.152 <sup>**</sup>
Fifth minute mean (SD <sup>*</sup> )	9.9 (0.7)	9.9 (1.1)	0.400 <sup>**</sup>
Weight at birth mean (SD <sup>*</sup> )	334.5 (325.5)	386.9 (325.5)	0.988 <sup>**</sup>
Exclusive feeding of infant by two month after delivery	145 (91.8)	146 (91.3)	0.525 <sup>‡</sup>

All numbers except the defined ones are shown as number (percent).

In the intervention group, there was one case of delivery with equipment.

\*Mean(Standard deviation) , \*\*T-test, †Fisher exact test, ‡process Chi-square, §Chi-square

**Table 2.** Comparing mean of depression grades in intervening and control groups

Variable	Intervention mean (SD)*	Control mean (SD)*	Mean difference (95% CI)**	P-value
Depression grade (0-30)				
Before intervention	6.1(3.2)	6.3(3.2)	(-0.2-1.8)-0.8	00.124
8 weeks after delivery	7.8(4.6)	8.8(5.4)		

Data are reported based on general linear model test having adjusted the basic values.

\*Mean (standard deviation), \*\*Mean difference (95% confidence level)

recognized mothers who are at high risk for postpartum depression via Edinburg's scale and showed that call supporting after delivery leads to high consent and significant reduction of postpartum depression among them (33). The non-pharmacological methods for labor pain relief used in this study include listening to soft music, using delivery ball, aromatherapy and showering. Several studies were done in this regard. One of these studies which is consistent with the results of this study is the research done by England and Sim which studied the effect of

therapeutic methods like aromatherapy, massage therapy, reflexology as supplement treatment on depression; however the documents are unconcluded and needs further studies (34). Meanwhile the result of study by Graham et al. for studying the effect of inhalation aromatherapy during radiotherapy on depression of 313 patients is similar to the current study. In the above research, no significant difference was seen between the two groups of intervention who used pure essence of lavender, bergamot and cedar and control who used placebo regarding depression

(35). Conrad and Adams showed that aromatherapy leads to significant reduction in postpartum depression. In this study which was done on high-risk women regarding postpartum depression, aromatherapy (combining rose and lavender extract) from 0 to 18 months after delivery in 15-min sessions, twice a week for 4 continuous weeks was used. The reasons for such difference can be related to duration of using aromatherapy, used extracts and sample size. The above study was a pilot study which was done on 28 high-risk women (36).

In a case study that was done for comparing music therapy with psychotherapy interventions (pharmacological therapy) for depression, results showed that in four out of five studies, there was much reduction in depression symptoms among individuals who were allocated randomly to the intervention group compared to the control group; meanwhile there was no statistical difference in the mental status of intervention group when comparing the music therapy. These results are similar to the current study (37).

In a study by Simavli et al. the effect of music therapy on pain relief during natural delivery and after delivery and mental health of 161 nulliparous mothers was studied. The results showed that postpartum depression among mothers in intervention group (80 women) was significantly less than mothers in control group (81 women) (38). The reason for such difference can be related to time of measuring depression and the type of music listened by the mothers. In the above study depression was measured 1 and 8 days after delivery, while in the current study it was 8 weeks after delivery. Also in the above study the desired music of mothers was used, while in the current study soft music without words (relaxing and classic ones combined with nature's sounds) was listened during labor.

In a study by Chang et al. on 236 pregnant women who were randomly allocated in two groups of music therapy (116 women) and control group (120 women), listening to music for two weeks during pregnancy significantly reduced the postpartum depression among mothers in intervention group (39). Chan et al. did two separate studies in 2009 and 2012 on adult and elderly in Hong Kong and Singapore and showed that using desired music by intervention group leads to significant reduction of depression among people in intervention group (40, 41). The considerable and different point of above studies with the current research is using the desired music for a longer duration. Being immersed in hot water during labor and delivery was used for relaxation and pain relief which has long record during clinical cares (42). A group of researchers in Virginia argue that thermal stressful methods can be suitable for treating cancer, chronic fatigue and depression (43). About the effect of using hot water showering on postpartum depression, no study was found. The study by Rush et al. on the effect of bathing in Jacuzzi tub during labor showed that it causes labor pain relief and leads to satisfaction (44). The lack of information on mothers'

mental condition when answering the questions was one of the issues that was beyond the control of the researcher.

### Conclusion

The results of this study showed that using non-pharmacological methods of pain relief in labor does not lead to significant reduction in mean grade of postpartum depression and the mean in intervention group is less than the control group. This indicates that such reduction can results from mothers' protection in encountering acute stressful factors and reducing their anxiety during labor by using non-pharmacological methods of pain relief of labor.

### Ethical issues

Ethical issues have observed in this study.

### Conflict of interests

There is not conflict of interests.

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