

# Meta-analysis of the role of delivery mode in postpartum depression (Iran 1997-2011)

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## ABSTRACT

**Background:** Postpartum period is the riskiest time for mood disorders and psychosis. Postpartum depression is the most important mood disorder after delivery, which can be accompanied by mother-child and family relationship disorders. Meta-analysis with the integration of research results demonstrates to investigate the association between the mode of delivery and postpartum depression. **Materials and Methods:** This meta-analysis uses the Rosenthal and Robin approach. For this purpose, 18 studies which were acceptable in terms of methodology were selected and meta-analysis was conducted on them. Research instrument was a checklist of meta-analysis. After summarizing the results of the studies, effect sizes were calculated manually and combined based on meta-analysis method. **Results:** The findings showed that the amount of effect size (in term of Cohen d) of delivery mode on postpartum depression was 0/30 ( $P < 0.001$ ). **Conclusion:** Delivery mode on maternal mental health is assessed medium. Meta analysis also indicates moderator variables role, and researcher must focus in these variables.

**Key words:** Cesarean section, meta-analysis, natural delivery, postpartum depression

## INTRODUCTION

Opening of various gates during the life of a woman is among the most glorious deeds that are inevitable for the interference of emotional, exciting, and physical stresses. Initially, happiness and excitement are dominant due to mental ambiguous situations, but shortly, the followings overcame upon her: A combination of fear and doubt, fear of pain, and events and uncertainty of the future. Delivery

with sudden environmental changes is considered as a kind of stress.<sup>[1]</sup> Pregnancy hormones can provide fields of mental-psychological changes and emotional distresses.<sup>[2]</sup>

Previous studies on different communities show that mental disorders in women are mainly seen in reproductive age and after the child's birth, the risks of occurrence of these problems are increased.<sup>[3]</sup> Hence, pregnancy and motherhood are known as a vulnerability potential period for the mental health of women.<sup>[4]</sup> In medical literature, it has been defined three types of mental disorders for the postpartum period as postpartum blues, postpartum depression, and postpartum psychosis. The former is a state of spontaneously regressive and does not require treatment. But, the next states are important due to their impacts on the family, becoming chronic, and returning of the disease.<sup>[5]</sup>

According to the DSM-V criteria, in case of symptom onset of mood disorders within four weeks after delivery, it can be said that it is due to postpartum depression. Characteristics of postpartum depression are including depressed mood, excessive anxiety, insomnia, and weight change. This disorder usually begins within 12 weeks postpartum or at least with

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a continuity of two weeks.<sup>[6]</sup> Mother is the first person to undertake child care, and maternal depression has a significant effect on infant development, which needs special attention. Depressed mothers compared with non-depressed mothers have little relevance with their babies. This issue causes the reduction of dependency of the mother and child. Consequently, the mother becomes increasingly indifferent towards her baby and can show him/her more aggressive behavior and devote less time for parenting.<sup>[7]</sup> The children of depressed mothers after the delivery are faced with lower IQ levels compared with the children of non-depressed mothers. These children are suffering from more sudden death in comparison with the children of healthy mothers.<sup>[8]</sup> Children of depressed mothers are more agitated and weaker in terms of linguistic evolution, and they are far behind their peers. There is a very high probability to mimic the behavior of depressed mothers by their children. These children in the future may be faced with problems on playing the role of their parents.<sup>[9]</sup> Postpartum depressions have detrimental effects on women and her marriage. Postpartum depression may result in early death.<sup>[7]</sup> The women tend to experience the delivery as they expected that before. This mental disorder in the mother causes abuse and discord in the whole family.<sup>[10]</sup> Incompatibility causes controversy and the reduction of spouse support, which gives rise to the caused problems.<sup>[11]</sup> These women, due to the fear of disease recurrence in case of pregnancy, have suicidal tendencies or infanticide. They are highly resistant against the next pregnancy. This can lead to severe conflicts and finally, it may be the cause of divorce, separation between the couples, and the breakup of the family.<sup>[12]</sup> Economic effects of maternal depression are considerable. These mothers are not able to fulfill their social, family, and their jobs' responsibilities. Thus, an important part of active work forces of society is damaged in addition to apparent damages to the economy of family and community. Other economic problems would be long-term treatment and related costs.<sup>[12]</sup> Depression, whatever mild, could cause weakness and would be effective on the role of mother on doing her family and job responsibilities. It can lead to job loss and disorganization of the family.<sup>[8]</sup> According to the dimensions of postpartum depression and numerous many-sided effects of it on mother and child, family, sexual life, occupational status, and finally, the impact on the community and its role in the family economy. Therefore, it is very important to think a bit further to this problem.

The research background has discussed on many factors for the incidence of depression in pregnant women such as type of delivery, serious tensions during the past year, unplanned pregnancy, gender of the child, first pregnancy, depressing systemic diseases such as hypothyroidism, bleeding after delivery, conflict with spouse, not giving milk to the baby, living without a spouse, infection after delivery, infant and mother hospitalization after the delivery.

In some studies, delivery method has been proposed among the risk factors of postpartum depression and maternal mental health problems. Cesarean section (CS) as a major surgery is a completely different phenomenon with vaginal delivery.

Cesarean delivery is not the desired and selected model, but it will be done in the presence of obstetric indications. Cesarean section is a concept in midwifery in order to describe the delivery of a live fetus through an incision on the abdomen (laparotomy) and the uterine lining (hysterotomy). The cesarean rate in our country is ongoing and alarming in recent years.<sup>[13]</sup>

Cesarean section, whether by mother's choice or whether by the advice of obstetrician, can create many problems for the mother and infant compared to vaginal delivery.<sup>[14]</sup> Maternal complications of cesarean section versus vaginal delivery have been impressive including increase in infection rates, genitourinary system (0.6 vs. 0.2), increased bleeding during and after childbirth twice as much, risk of blood transfusion (0.02 vs. 0.07), complications of general anesthesia (0.53 vs. 0.21), and general complications of surgery (2.73 vs. 0.9).<sup>[15]</sup> Studies have shown that cesarean is a prognostic factor for the incidence of depression and maternal mood disorders.<sup>[16,17]</sup>

However, in recent decades with the aid of reducing maternal mortality, pregnancy and childbirth have become increasingly a hospital or medical state, which has led to an increase in cesarean section rates.<sup>[18]</sup> Cesarean section rate in many countries has a remarkable difference with the announced figures from the World Health Organization, i.e., 5-15% of deliveries. This rate is growing over the time.<sup>[19]</sup> The rate of cesarean section in Iran is three to four times of the acceptable level by the World Health Organization. This means that more than 60% of pregnant women due to unnecessary reasons, fear of labor pain, and complications of vaginal delivery are seeking CS. High rate of cesarean delivery in the country and especially in private centers confirms this issue.<sup>[19,20]</sup> Request for selective cesarean section is the main reason for increasing the rate of cesarean section. However, the evidence is weak to prove this point that the women in the absence of clinical problems request for cesarean section. These requests are only a small part of the cesarean section. Mental-psychological challenges and feeling the risk for the mother and fetus seem to be the main causes of maternal desire for delivery by using cesarean method. So that fear, long and difficult deliveries have been associated with an increase in cesarean request by the mother's choice. Such attitudes towards the delivery method may be relevant to the comprehension of the benefits of cesarean section quoted by health care providers or memories and experiences of friends and acquaintances or reading the newspaper article about the type of delivery.<sup>[21]</sup>

Several independent studies have been done at the level of scientific centers in this regard in Iran. However, various methods and tools, which are used in these studies, have provided different and contradictory findings in the background incidence and related factors in mothers with postpartum disorders. Based on the performed study by the care centers covered by Shahid Beheshti University of Medical Sciences (2009), it has been identified that there was a significant relationship between the type of delivery

and postpartum depression. Risk of depression after cesarean delivery is approximately two times more than the normal delivery. Among other researches, which have been done in this field in Iran and pointing about the relationship between these two variables, it can be referred to the researches of Dolatian,<sup>[22]</sup> Hadizadeh,<sup>[23]</sup> Mangoli,<sup>[24]</sup> Ebrahimi,<sup>[25]</sup> Abedian,<sup>[26]</sup> Nikpour,<sup>[27]</sup> and Salimian.<sup>[28]</sup> In these studies, they concluded that CS more likely rises the women's risk for postpartum depression. On the other hand, researches conducted by Sharifi,<sup>[29]</sup> Mohammadi,<sup>[30]</sup> Sehhati Shafaei,<sup>[31]</sup> Khorrami Raad,<sup>[32]</sup> Panahi,<sup>[33]</sup> Sadat,<sup>[34]</sup> and Farzad<sup>[35]</sup> have led to this conclusion that there was no significant relationship between mode of delivery and maternal depression.

Inconsistency in this area is seen in the foreign studies. For example, Josephson *et al.* in a study entitled "obstetric, physical, and demographic factors associated with postpartum depression" have expressed that there was no relationship between the type of delivery and incidence of postpartum depression.<sup>[36]</sup> In this regard, Huang<sup>[37]</sup> in a research entitled "predictive factors of mental health upon delivery" demonstrated that delivery method whether vaginal delivery or cesarean delivery has no correlation with postpartum psychiatric disorders.

Adooya and colleagues in a study entitled "social, demographic, and obstetric risk factors associated with depressive symptoms in Nigerian women" concluded that vaginal delivery by using tools or cesarean section are among the major factors in the incidence of postpartum depression.<sup>[38]</sup> Based on the obtained results from a research in Vietnam entitled "occurrence, nature, intensity, and related factors with postpartum depression," this result was achieved that CS could be related to the incidence and severity of symptoms of postpartum depression.<sup>[39]</sup>

According to some studies' results, they have known CS as an effective factor in the incidence of postpartum depression. Chayam in a study in Lebanon entitled "depression after childbirth, incidence, and related factors" achieved an interesting result. Chayam stated that the incidence of postpartum depression has been greater in women with vaginal delivery compared with those who had undergone cesarean section, and vaginal delivery has been proposed as a risk factor for them.<sup>[40]</sup>

Since most of the mothers and even physicians believe in the superiority of cesarean section compared with vaginal delivery due to feeling more comfortable and according to the inconsistency in the studies' results, this study was conducted with the aim of integrating the results of different studies by using meta-analysis research model and to examine the relationship between the mode of delivery and postpartum depression.

## MATERIALS AND METHODS

In this study and according to its aim, it has used the method of "meta-analysis" with Rosenthal and Rubin approach.

Meta-analysis has been carried out by the calculation of a single statistic for each study, which was indicative for the results. This is usually a statistic of effect size.<sup>[41]</sup> The statistical population included thesis, research projects, and published researches in scientific journals over the past 13 years (1997-2011). These subjects had been done in the context of the delivery method in Iran on postpartum depression. They were collected based on a standard checking list (meta-analysis checking list contains the data in Tables 2 and 3, which is given below completely). Then, those approved studies have been entered into the current research in terms of methodology and criteria. The survey was conducted for 26 articles with related topics. Eight articles due to the lack of available statistics, no possibility to calculate, and impossibility to access the author of the article were excluded from the research. Therefore, 18 articles have been entered into the study. Searching resources in the current study included Master's theses and PhD dissertations in universities, scientific journals in the field of psychology, and data banks of Jahad Daneshgahi and Documentation Center of Iran (keywords for search included maternal mental health, depression after childbirth, kind of delivery, vaginal delivery, and cesarean section). All of examined resources and researches have been conducted in Iran from 1997 to 2011. In case of lack of quality or necessary information in a published article in a magazine, it was referred to the thesis, paper, research project or mail contact directly with the author to obtain more complete information. If no response were received, there would be a face-to-face visit to the related university for collecting the needed information.

The fitted criteria for the meta-analysis included: 1- Having necessary requirements in terms of methodology (hypothesis building, research methodology, study population, sample volume, sampling method, measurement tools, validity and reliability of measurement, statistical assumptions, statistical analysis method, and correct statistical calculations), 2- Research subject about the delivery method in mental health of mothers or postpartum disorders, 3- The survey should be in the form of a research group (not a case-sensitive or a single test) and was implemented during 1997 to 2011, and 4- Papers, which referred to some of effective factors on maternal depression, were excluded from the present study (factors such as history of progesterone, mother and the family depression, hospitalization, depressing systemic disease, anomaly, serious bodily and mentally tension over the last year).

Content analysis checking list (in terms of methodology) was used to select the thesis and research papers with fitted criteria and extract the necessary information to perform a meta-analysis. The mentioned list included the following components: Subjects of the conducted researches, full specifications of the conductors, year of research implementation, tools, reliability, and validity of the measurement tools, statistical population data, and sample size.

Four basic steps should be taken in performing a meta-analytic approach: Identification, selection, abstraction, and analysis.<sup>[42]</sup>

In order to obtain the rate of effect size, no software was used. Effect size of each study has been calculated manually, because in many Iranian medical journals, it is not usually provided the needed statistics for calculating the effect size and it just be satisfied with the level of significance (p). The calculation was performed in the magazines with the possibility to calculate the statistics. Afterwards, they were converted to effect size or other indicators such as mean and standard deviation. Otherwise, the contact was made with the author.

Converting to Cohen's d and r were presented in Table 1.

After converting to d, g can be obtained from the formula

$$\text{number } 1 \ g = \frac{d}{\left(1 - \frac{3}{4N-9}\right)} \quad (1)$$

If the meta-analysis calculation is obtained with Rosenthal and Rubin method, based on formula numbers 3 to 5, calculations can be performed.

$$\bar{z}_r = \frac{\sum_{j=1}^k N_j Z(r)_j}{\sum_{j=1}^k N_j} \quad (2)$$

$$Z(r)_j = \frac{1}{2} \log \frac{1+r_j}{1-r_j} \quad (3)$$

$$r = \frac{\exp(2\bar{z}_r) + 1}{\exp(2\bar{z}_r) - 1} \quad (4)$$

Significant the mean effect size is calculated by the formula number (5)

$$Z = \frac{\sum_{j=1}^k Z_j N_j}{\sqrt{\sum_{j=1}^k N_j}} \quad (5)$$

**Table 1: Converting different statistics to indicators of Cohen's d and r**

Converting to R	Converting to d	Statistic
$\frac{\sqrt{t^2}}{\sqrt{t^2 + df}}$	$\frac{2t}{\sqrt{df}}$	t
$\frac{\sqrt{F}}{\sqrt{F + df_{\text{error}}}}$	$\frac{2\sqrt{F}}{\sqrt{df}}$	F
-	$\frac{2r}{\sqrt{1-r^2}}$	r
$\frac{d}{\sqrt{d^2 + 4}}$	-	d
$\sqrt{\frac{X^2}{N}}$	-	$X^2$

After referring to author, in order to avoid the loss of papers due to failure to provide complete statistics in some articles with lack of needed information and according to sample size and significant level, formula number (6) has been used for approximate estimate of effect size.

$$r = \frac{Z}{\sqrt{n}} \quad (6)$$

The formulas of (7), (8), and (9) were used if in addition to the variables of the study, there were other moderator variables in the calculations.

$$\frac{SEV}{V_{\text{total}}} \quad (7)$$

$$SEV = \frac{(N-4)(N-1)}{N(N-3)} \left(1 + \frac{\bar{d}}{8}\right) \quad (8)$$

$$V_{\text{total}} = \frac{\sum_{i=1}^k N_i (d_i - \bar{d})^2}{\sum_{i=1}^k N_i} \quad (9)$$

Calculation method of effect size with Rosenthal and Rubin approach is superior to other conventional methods in meta-analysis such as Hedges, Oaklyn, Hunter, and Schmidt methods when the researches were relational, epidemiology or causal after the occurrence. The reason is that standard error of measurement "r" is not calculable (due to a correlation coefficient parameter of the entire community), but with converting to Fisher Z, the standard error of measurement could be computed.<sup>[43]</sup>

## RESULTS

In order to achieve the objectives of the present study, this part contains three sets of findings.

The first category is included the descriptive data of the used studies in the meta-analysis. These cases are presented in Table 2 entitled "Descriptive information of the used studies in the meta-analysis.

Table 3 has been adjusted for the presentation of the related data of the used studies in the meta-analysis and the result would be the data collection for analysis.

The third category of findings is obtained from the analysis phase of the studied samples. The obtained results of the collected combined studies were presented in Table 4. These results are in line with the research objectives.

## DISCUSSION AND CONCLUSION

The effect size indicates the amount or degree of participation of an event in the community. Whatever larger it is, the degree of participation of an event in the community would be higher. According to Cohen Table, the results of this meta-analysis are assessed as moderate.

The findings of this meta-analysis are consistent with the results of previous researches including: Sharifi,<sup>[29]</sup> Mohammadi,<sup>[30]</sup>

**Table 2: Descriptive information used in the meta-analysis research**

Statistic	Instrument	Sample Size	Source	Publishing year	Title research	Correspondence Author	Row
T	Beck	200	Journal of Shahid Beheshti University of Medical Sciences	2005	Investigate the relationship between type of delivery and postpartum depressive symptoms	Mehrnaz Farzad	1
T	Beck	460	Journal of Faiz	2008	Investigate the relationship between type of delivery and postpartum depressive	Khadijesharifi	2
$\chi^2$	Epds	148	Journal of Reproduction and Infertility	2005	Investigate the relationship between type of delivery and postpartum depressive	Mahrokhdolatian	3
t	Epds	52	Journal of Kermanshah University of Medical Sciences	2004	Comparison of postpartum depression, vaginal and cesarean section in primiparous women	Fateme Hadizadeh	4
F	Epds	600	Journal of Ardebil University of Medical Sciences	2007	Evaluation of risk factors associated with postpartum depression	Fahime Sehatshafaie	5
$\chi^2$	Beck	112	The 1 <sup>st</sup> student national congression social determinants of health	2010	Evaluation of risk factors associated with postpartum depression	Roghaye Mohamadi	6
T	Epds	504	M.Sc. Thesis, Isfahan University of Medical Sciences	1997	Evaluation of risk factors associated with postpartum depression <sup>[44]</sup>	Roshanak Hasanzahraie	7
T	Epds	300	Journal of Shahid Beheshti University of Medical Sciences	2010	The prevalence of postpartum depression and associated factors	Ashraf Khoramirad	8
$\chi^2$	Beck	412	Journal of zahedan University of Medical Sciences	2001	The effect of mode of delivery on post partum depression	Maryam Ebrahimi	9
$\chi^2$	Epds	480	MA thesis. Iran University of Medical Sciences	1998	The prevalence of postpartum depression and its risk factors <sup>[45]</sup>	Mehravar sharifi	10
$\chi^2$	Epds	100	Journal of Ardebil University of Medical Sciences	2004	The prevalence of postpartum depression and its risk factors <sup>[46]</sup>	Mohamad Narimani	11
T	Epds	263	Journal of babol University of Medical Sciences	2008	The prevalence of depressive symptoms before and after delivery and its relationship with effective factors	Hajar Salimian	12
T	Beck	640	Professional Doctorate thesis in Isfahan University of Medical Sciences	2004	Determine the prevalence of postpartum depression and its related factors	Zahra Abedi	13
T	GHQ Beck	384	Professional Doctorate thesis in Isfahan University of Medical Sciences	2003	To determine the frequency of postpartum depression and its association with maternal mental health <sup>[47]</sup>	Zahra Kiani	14
$\chi^2$	Beck	408	Journal of Zabol University of Medical Sciences	2005	Prevalence and risk factors of postpartum depression in women	Abolfazl Panahi	15
Z	GHQ	288	Journal of Gorgan University of Medical Sciences	2004	Midwifery and psychological factors affecting the mental health of women after delivery <sup>[48]</sup>	Fateme Behdani	16
$\chi^2$	Beck	330	Journal of babol University of Medical Sciences	2008	Postpartum depression and its relationship with some factors <sup>[49]</sup>	Hamze Hoseini	17
$\chi^2$	Epds	975	Journal of Kermanshah University of Medical Sciences	2005	Postpartum Depression and its Relationship with Stressful Life Events <sup>[50]</sup>	Mahshid jaafarpour	18

Sehhati Shafaei,<sup>[31]</sup> Khorrami Raad,<sup>[32]</sup> Panahi,<sup>[33]</sup> Sadat,<sup>[34]</sup> and Farzad.<sup>[35]</sup> The obtained results are inconsistent with the researches of Dolatian,<sup>[22]</sup> Hadizadeh,<sup>[23]</sup> Mangoli,<sup>[24]</sup> Ebrahimi,<sup>[25]</sup> Abedian,<sup>[25]</sup> Nikpour,<sup>[27]</sup> and Salimian.<sup>[28]</sup>

Moderate effect size between postpartum depression and type of delivery could be due to more feeling of pride and success, higher satisfaction with the childbirth experience and birth of newborns compared with women with cesarean deliveries

**Table 3: Related data of the used studies in the meta-analysis**

G	D	r	Statistic	Z <sub>r</sub>	Z	P	N	Columns
0/18	0/18	0/09	-	0/09	1/405	0/08	200	1
0/04	0/14	0/018	t=0/39	0/01	1/555	0/06	460	2
0/18	0/18	0/09	-	0/31	3/719	0/0001	148	3
0/58	0/58	0/28	t=2/12	0/266	3/09	0/001	52	4
0/28	0/28	0/14	F=17/84	0/14	1/645	0/05	600	5
0/08	0/08	0/04	χ <sup>2</sup> =2/12	0/04	1/75	0/04	112	6
0/08	0/08	0/04	t=0/95	0/03	0/30	0/38	504	7
0/04	0/04	0/02	-	0/02	0/49	0/31	300	8
0/22	0/22	0/11	χ <sup>2</sup> =5/66	0/10	2/05	0/02	412	9
0/41	0/41	0/20	χ <sup>2</sup> =20/55	0/20	2/23	0/01	480	10
2/02	2/02	0/71	χ <sup>2</sup> =50/55	0/88	2/23	0/01	100	11
0/39	0/39	0/19	t=3/14	0/19	3/09	0/001	263	12
0/98	0/98	0/44	t=4/87	0/01	0/02	0/49	640	13
0/02	0/02	0/01	-	0/01	0/55	0/29	384	14
0/04	0/04	0/02	-	0/02	0/20	0/42	408	15
0/19	0/19	0/39	χ <sup>2</sup> =8/91	0/18	3/09	0/001	288	16
0/24	0/24	0/12	t=0/27	0/08	1/55	0/06	330	17
0/08	0/08	0/04	-	0/04	1/40	0/08	975	18

N = Sample size, P = Significance level, Z = Distribution of normal  
Z, Z<sub>r</sub> = Conversion fisher Z, r = Effect size (Pearson correlation coefficient), effect size (d), g: effect size (g glass)

**Table 4: The obtained results of the collected combined studies**

SEV/V <sub>total</sub>	V <sub>total</sub>	SEV	Significance level	Mean of effect size
0/33	0/009	0/003	P=0/00001	d=0/30

SEV = Sampling error variance

for two weeks after delivery in a mother who has endured pain during vaginal delivery.<sup>[16,34]</sup> Some other studies have also confirmed these results. Clement in a meta-analysis of 19 studies<sup>[51]</sup> and Oasis<sup>[52]</sup> demonstrated that on average, satisfaction rate of childbirth experience and birth of newborns in women after cesarean section have been lower than women with normal vaginal delivery. Due to the impact of the experiences of the previous two weeks on the current life of the mother, positive effects of childbirth experience and birth of newborns have made better feelings about themselves. Therefore, the mother will do her maternal duties well. The patients during cesarean section are usually facing with painful hours and unknown matters. In our country, these things are not likely to be explained crisp and clear to the patient before the delivery. However, the speculations would arise that these hours may have been involved in causing depression in the postpartum period.

On the other hand, mothers with cesarean section will be further supported on behalf of their families and spouses. Their caring and helping will be more than mothers with normal deliveries. Therefore, due to the received supports in providing care for the newborn, there will be lower fatigue, insomnia, and exhaustion in these mothers, and their rest and recovery time will be longer too. In case of selecting cesarean section by mother's choice, due to more mental preparation in women and their families, depressive symptoms' levels will

be reduced after the delivery. If only emergency cesarean sections just were evaluated, levels of postpartum depression symptoms showed an increase in the cesarean section group.<sup>[29]</sup> Lack or less use of painless delivery in normal childbirth leads to more stress. This stress can interfere in disclosure of depressive symptoms after the delivery.<sup>[22]</sup> Iranian women are leading to the cesarean section for the following cases: Escape the pain of vaginal birth, fear of neonatal complications during vaginal delivery, changing the beliefs and culture of childbirth, considering cesarean section as a new spread model in the society, lack of knowledge about the benefits of vaginal delivery, disadvantages of cesarean delivery, and also no information about the types of painless delivery. Cesarean section does not take much stress compared with vaginal delivery for women.<sup>[27]</sup>

Another important part of the meta-analysis is to discover other variables, which can cause interference in the relationship between the two investigated variables. It means that the researcher by using mathematical equations discovers the existence of this intermediate variables and according to previous studies in this field, he can predict the moderating variables. In fact, if the sampling error was 0.75 or more of the total variance, the variance is related to the measurement error and the relationship has not been influenced by a moderator variable. In the present study, the ratio of  $\frac{SEV}{V_{total}}$  was calculated as 0.33-0.75. Therefore, there are moderating variables that can affect the main variables. Other inclusion criteria for the meta-analysis were samples free of maternal and family depression, hospitalization, depressing systemic disease, anomaly, and serious physical and mental stress over the past year. Thus, according to previous studies, probably other factors mentioned in some of these studies (such as marital satisfaction, social support, unwanted pregnancy, frequency of delivery, age, educational level, social class, and maternal employment) have impacts on the mental health of the mother after the delivery. Attention to these regulation roles should be observed by adjusted regression. In the methodology of the conducted researches, unfortunately, adjusted regression was underused. There were eight phased regression studies (studies 1, 2, 3, 5, 6, 7, 10, and 17). There were also two causal-comparative studies (studies 4 and 9), and the other 10 studies were prevalence and frequency type. None of the studies have used the role of moderating variables. This issue represents the serious shortcoming in this type of researches in Iran (where it is referred to adjusted regression by multiplying the moderator agent to the dependent variable). Therefore, it is recommended to the future researchers to pay more attention to the role of moderating variables on postpartum depression.

Finally, it must be considered for obtaining a definitive answer to the question of "cesarean section, yes or no;" it is necessary to conduct further meta-analysis in the context of the delivery method on physical health of the mother and the role of delivery method on the child's mental and physical health. Although It has been tried in this meta-analysis to examine all of the relevant studies (researches, thesis and

articles) in terms of content and it should not be limited to published studies or those studies, which are available easily by searching in the Internet. Among the limitations of conducting such meta-analysis, it can be cited for having access to resources and conducted researches, which have been published in a specified domain. Many studies were excluded from the meta-analysis due to the lack of a full report from the statistical indicators. Therefore, it is useful to welcome the repetition of different topics to check out more samples out of the targeted population. In addition, it is recommended to mention the exact amount of statistics in the related medicine studies in order to use scientific methods for meta-analysis in comparing their results in general.

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