

***Early Maladaptive schemas and Premenstrual syndrome in mothers  
with postpartum depression***

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**Abstract**

**Background:** Mood disorders constitute a prevalent problem during the postnatal period. Nonetheless, there is not adequate information on the underlying mechanism of postpartum depression (PPD).

**Objectives:** Therefore, this study aimed to investigate the role of early maladaptive schemas (EMSs) and premenstrual syndrome (PMS) in mothers with postpartum depression (PPD) referring to health centers in Mashhad.

**Methods:** To carry out this cross-sectional study purposeful sampling was used to select 179 mothers who referred to health centers in Mashhad during February, March, and April of 2018 and met the relevant criteria of the study as the participants. Participants completed Young's Early Maladaptive Schema, Premenstrual syndrome (PSST) and the Edinburgh Depression Scale. Descriptive statistics and stepwise regression analysis were used to analyze the data with SPSS version 20.

**Results:** The participants ranged in age from 19 to 41 and their mean age was  $29.7 \pm 8/7$ . This group of participants consisted of 106 mothers who had experienced their first delivery, 42(24.4%) mothers who had experienced their second delivery, and 24(14%) mothers who had experienced their third delivery. The results revealed that PMS ( $P < 0/001$ ;  $r = 0.56$ ) and EMSs ( $P < 0/05$ ;  $r = 0.65$ ) had significant correlations with PPD. PMS and EMSs together predicted 42% of the variance of PPD.

**Conclusion:** The findings of this study suggest that PMS and EMSs affect mothers' PPD.

**Keywords:** *adaptation, cognitive dysfunction, depressive disorder, female*

**Introduction**

Mothers face many challenges during pregnancy and postpartum period. Although the majority of mothers overcome the challenges in these stages, a number of them cannot recover from postpartum period easily [1]. PPD after childbirth is one of the complications that may affect mothers' in postpartum period. PPD is a mood disorder which affects approximately 10 to 15 percent of adult mothers yearly [2]. PPD can also deteriorate mother-infant relationship and affect all aspects of mother's life including her social activities, personal functioning, and housekeeping ability. Furthermore, it puts mothers at risk of experiencing depressive episodes or developing depressive disorders later in life [3]. Depressed mothers may show more negative reactions and a less responsive parenting style [4]. These issues

may constitute harmful experiences for the infants. Causes of PPD are not known. Some researchers enumerated feelings of disappointment, fear, fatigue, anxiety, stress of newborn care, poor marital relationship, as well as the involvement of hormonal agents such as endorphin, estrogen and progesterone levels as the probable causes of this type of depression [5]. According to the bio psychosocial model, depression has biological, social and psychological dimensions [6]. During the postpartum period, the amounts of circulating estrogen and progesterone decrease abruptly and these abrupt hormonal changes may play a key role in the heightened risk of depression during the postpartum period [7]. Moreover, this hormonal change can be responsible for PMS [8]. PMS is a common health problem in women of

reproductive age and is defined as a collection of emotional symptoms, with or without physical symptoms, related to a woman's menstruation cycle [9]. The prevalence of PMS has been reported in 20 to 32 percent of women in premenopausal period [8]. There is some evidence which shows a link between PPD and PMS [9]. The results of the studies into the correlation between PMS and PPD are inconsistent, A recent systematic review of eleven papers found a positive association between PMS and PPD beyond the effects of bio psychosocial confounders. Nonetheless, two studies did not find any significant relationships between PMS and PPD [10].

On the other hand, Nor Dahl et al. (2019) found that EMSs were related to mothers' bonds with their infants. This association was mediated by the mothers' symptoms of depression [11]. EMSs are developed early in childhood and may remain dormant until they are activated by situations relevant to a particular schema. According to initial description of Beck and Freeman (1990), depression is associated with EMSs and habitual thought patterns [12]. A large number of studies have shown that there is a relationship between depression and EMSs [13]. Nonetheless, some studies have not found a relationship between EMSs and depression [14]. The review of related literature shows that, there is a lack of research regarding the relationship between PPD and EMSs. Postpartum duration is a very sensitive stage for new mothers and infants. Given the high prevalence of PPD, there is a need for further research to determine the underlying mechanism and development of suitable interventions. This study was conducted to investigate the role of EMSs and PMS in mothers' PPD.

## Methods

### Design of the study and ethical considerations

The present study was a cross-sectional correlational study. Prior to the beginning of study, written consent was obtained from the participants. The participants were informed of the aims before receiving the questionnaire. Moreover, they were apprised of the fact that they were free to leave the study at any stage. The research committee of the Islamic Azad University (Neishabur branch) approved the

present study with ethical code number of IR.IAU.NEYSHABUR.REC.1396.10.

### Sampling

The study involved all of the new mothers who referred to the selected main health centers in Mashhad during February, March, and April of 2018. In order to conduct the study, first, one region was randomly selected from among 13 districts (No\_3). This region included five main health centers including center1, center 2, center 3, center 4, and center 5. All of these centers were included in this study. The researcher administered the Edinburgh Depression Scale, Early Maladaptive Schema and Premenstrual syndrome to all of the new mothers who met the participant selection criteria of the study. The inclusion criteria comprised: being willing to participate in study, being Iranian, being a resident of Mashhad, having the minimum academic degree (i.e. the high school diploma), having the experience of delivery within the last 3 months, and earning a score in the range of 15 to 20 on the Edinburgh Depression scale [15].

The exclusion criteria involved: being unwilling to participate in the study, having a history of suicide, being a smoker, using alcohol and drugs, having any medical or mental condition (based on the participants' responses to the self-report questionnaire), having a history of PPD in the previous deliveries, having the experience of stressful events during pregnancy such as the death of loved ones or divorce, and failing to completely fill the questionnaire. According to Morgan table-384 cases received the questionnaire. Nonetheless, 205 of these cases were excluded due to the fact that their scores fell out of the score range (i.e.15 to 20) on the Edinburgh Depression scale. Finally, the data of 179 cases were analyzed.

### Instruments

In addition to demographic information, the following instruments were used to collect the data:

Edinburgh Depression Scale: This 10-item self-report questionnaire examines the symptoms of emotional distress during pregnancy and the postnatal period. Each item is followed by four choices. The score range of 1 to 9 indicates the presence of some symptoms of distress which may be short-lived and trivial. The score range of

10 to 15 is considered as postpartum blue and the scores which are higher than 15 indicate PPD [15]. Mosalla-Nejad reported that the sensitivity and reliability of this scale for the Iranian population were 75.6 and 65.8 respectively. The positive predictive value of the test was 62.2 and its negative predictive value was 2.79. Moreover, the accuracy of the correct diagnosis of the test was 6.72 and its confidence limit was (0.062) [16]. In this study, the content validity of the scale was confirmed by 5 experts. The Cronbach's Alpha measure of reliability of this scale was 0.69.

**Early Maladaptive Schema:** This instrument is the third edition of Young's schema questionnaire and comprises 90 items which examine 18 aspects of the early maladaptive schema. Participants were asked to describe themselves by rating descriptive statements on a 6-point Likert-type scale ranging from "completely untrue of me" to "describes me perfectly". Higher values indicate a stronger presence of the respective schema [17]. Therefore, the questionnaire score was the sum total of all of the scores for the questionnaire items. The Cronbach's alpha and the half split internal consistency coefficients of the YEMSQ for the whole sample, were 0.91 and 0.86 respectively. Furthermore, these coefficients were 0.87 and 0.84 for females and 0.84 and 0.81 for males respectively (18). In the present study, the content validity of this scale was confirmed by 5 experts. The Cronbach's Alpha measure of reliability of this instrument was 0.72.

**Premenstrual syndrome (PSST):** This instrument is the screening tool which was developed by Steiner et al. and reflects and translates categorical DSM-IV-TR criteria into a rating scale with degrees of severity. It includes 14 items which examine premenstrual symptoms of mood, anxiety, sleep, and appetite along with the physical symptoms. Moreover, it includes functional impairment items within five different domains. Participants rated their experience of each symptom and functional impairment of menstrual cycle within the last 12 months on a 4-point Likert-scale comprising "not at all (0)," "mild (1)," "moderate (3)," or "severe (4)" "PMDD," "moderate to severe PMS," and "no/mild PMS" subjects were identified using PSST scoring criteria. This scale has been translated into Persian and has been validated.

The Cronbach's alpha measure of reliability of this instrument was 0.9 and its content validity ranged from 0.7 to 0.8 [19]. In this study, the content validity of the scale was confirmed by 5 experts. The Cronbach's Alpha measure of reliability of this scale was 0.80.

### **Statistical analysis**

The collected data were analyzed with SPSS 20 after excluding the invalid questionnaires. Mean and standard deviation values were used to describe the data. Moreover, frequency and percentage were employed for describing the participants' characteristics. The Pearson correlation and the multiple regression tests were used to examine the correlation between variables. Durbin Watson and inflation variance indices were used to check the assumptions. Initially, the normality of data distribution was investigated using Kolmogorov-Smirnov statistical test. The significance level was 0.05.

The multivariate regression analysis was used to determine the role of maladaptive behavior and PMS in PPD. To this end, the basic assumptions of this test such as normality of data distribution, elimination of irregular data, linearity, homogeneity of variances, and the absence of multiple parallelism were examined through the Durbin Watson test and the coefficients of variance inflation factor (VIF).

### **Results**

The participants were in the age range of 19 to 41 and their average age was  $29.7 \pm 8/7$ . From among the 179 cases, 59.2 had experienced their first delivery, 42 cases (24.4%) had experienced their second delivery, and only 24 cases (14%) had experienced their third delivery. The majority of participants (61.7%) had either a high school academic degree (i.e. high school diploma) or a lower degree. The rest of the participants had university-level academic this is correct. Finally, 83% of participants were housewives.

The results of data analysis regarding the relationship among maladaptive behavior, PMS, and PPD are presented in Table 1 and Table 2. EMSs with mean $\pm$ SD (116/63 $\pm$ 24/54) had a strong relationship with PPD ( $r=0.65$ ,  $P<0.01$ ). Furthermore, PMS with mean $\pm$ SD (29/32 $\pm$ 6/80) had a strong relationship with PPD ( $r=0.56$ ,  $P<0.01$ ).

As shown in the Table 2, the EMSs ( $F=128.12$ ,  $P<0.05$ ,  $R^2=0.42$ ) and PMS ( $F=84.08$ ,  $P<0.001$ ,  $R^2=0.49$ ) could predict % of the variance of PPD (Table 1).

The results of regression showed that EMSs predicted 0.43 of the variance of PPD and PMS

predicted 0.31 of the variance of PPD. The result of  $\beta$  indicated that EMSs were a stronger predictor (0.65) of this is correct in comparison with PMS(0.30) (Table 2).

**Table 1: Mean, standard deviation and Pearson correlation coefficient of EMSs, PMS with PPD**

Variable	Mean	SD	Pearson correlation with PPD	P
EMSs	116.63	24.54	0.65	0.000*
PMS	29.32	6.80	0.56	0.000*
PPD	17.50	1.68	1	0.000*

**Table2: Statistical indices of stepwise regression**

Step	variable	R	R2	F	B	$\beta$	t	P
1	EMSs	0/65	0/43	0/42	0/04	0/65	11/31	0.000*
2	PMS	0/56	0/31	0/31	0/13	0/56	8/82	0.000*

## Discussion

The aim of this study was to investigate the role of EMSs and PMS in the prediction of new mothers' PPD. The results indicated that there was a significant positive relationship between PMS and PPD. Moreover, there was a significant positive relationship between EMSs and PPD. Furthermore, the results showed that the EMSs and PMS had the potential for the prediction of mothers' PPD. EMSs were a stronger predictor and predicted 0.43 of the variance of PPD. In addition, PMS predicted 0.31 of the variance of PPD.

The findings of this study highlighted the relationship between EMSs and PPD. These findings are in line with the findings of the study by Thim [20] which showed that psychological distress such as depression disorders was related to EMSs. Likewise, Balsamo reported a relationship between depression and EMSs. Nonetheless, he emphasized the role of coping style [14].

According to cognitive theories, these findings can be attributed to the fact that EMSs are related to negative deeply-rooted beliefs about the self, others, and the world. In fact, schemas are frameworks of information processing and ways of conceptualization of stimuli for each person [12]. Therefore, if a new mother suffers from stress and disability during postpartum and uses higher EMSs, she will experience a feeling of disappointment. According to Young and

colleagues (2003), the development of EMSs can contribute to a wide variety of psychosocial and character ological outcomes in adulthood, including a higher likelihood of experiencing negative emotions or depression [12].

Moreover, the results of this study revealed that participants with higher levels of postpartum depression had higher PMS scores. This finding is in line with the findings of the study by Butner et al. (2013). The results of their study showed that PMS was an important risk factor in PPD. Women with a history of PMS should be monitored during the perinatal period. As Lee et al. stated hormone-related etiology may be a risk factor in postpartum depression due to the fact that there was a correlation between PMS and PPD [7]. In a recent systematic review of eleven papers, Castelo (2018) found a positive association between PMS and PPD. Nevertheless, the researcher did not find a significant association between the aforementioned variables in two studies [21]. These results may stem from some sociodemographic differences between samples and methods.

This finding can be ascribed to the role of the estrogen-serotonin link as a common etiologic biological mechanism between PMS and PPD. Females with PMS manifested symptoms as an abnormal response to normal hormonal fluctuations. This issue may explain their hormonal responses to their delivery experience. Furthermore, the effects of estrogen fluctuation on

serotonin transmission have been identified in both animal and human studies. This issue might be the reason behind the vulnerability of some cases to PDD [10].

According to the findings of this study, EMSs were important risk factors in emotional disturbances. In addition, higher scores on PMS could affect the depression. As a cross-sectional study, this study had a number of limitations. The present study examined the mothers with postpartum depression in one city. Consequently, caution should be exercised in the generalization of its results to other contexts. A similar study should be conducted to investigate the clinical population of mothers who suffer from postpartum depression. There is a need for further physiological research to determine the underlying mechanism of PMS and its relationship with postpartum depression. Regarding the disease history, the data of this study were limited due to the fact that they were collected based on self-report tools. Therefore, it is recommended that future studies utilize lab evaluations of the PMS-related factors such as hormonal disturbance. On the other hand, this study focused on a single variable. Nonetheless, PPD is associated with several factors. Consequently, future research should examine the role of these components, especially their differences in the prediction it is correct PPD as a mood disorder. The responsibilities, father cooperation, social capital, and support must be compared in future research studies.

According to the findings of this study, EMSs were important risk factors in emotional disturbances. In addition, the sensitivity of females to stress indicated their vulnerability to different types of psychopathology [12]. Therefore, the EMSs can explain a wide range of disorders. As studies showed, they were relevant to treatment outcome. The measurement of EMSs in treatment settings to design personal and effective protocols for the treatment of postpartum depression in mothers might be a suitable line of research for further studies. There is a need for interventions which have the potential for the prevention of PPD and the improvement of the parent–infant relationship. This may further promote the child's healthy growth.

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### Conflict of interest

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