http:// ijp.mums.ac.ir
Original Article (Pages: 12865-12876)

# Evaluation of Sociocultural, Obstetric, and Child Related Factors Associated with Postpartum Depression in Bushehr, Southwest of Iran

*Fatemeh Najafi-Sharjabad[1], Niloofar Davani[2], Saba Rayani[3], Salimeh Mohammadi[4]

[1]Department of Public Health, Faculty of Health and Nutrition, Bushehr University of Medical Sciences, Bushehr, Iran. [2]School of Medicine, Bushehr University of Medical Sciences, Bushehr, Iran. [3]Department of Psychology, Faculty of Literature and Humanities, Persian Gulf University, Bushehr, Iran. [4]Department of Public Health, Faculty of Health and Nutrition, Bushehr University of Medical Sciences, Bushehr, Iran.

***Abstract***

***Background***

Postpartum depression (PPD) can have serious consequences for both the mother and infant. We aimed to investigate the prevalence of postnatal depression and associated sociocultural, obstetrics and child-related factors among Iranian women.

***Materials and Methods:*** This is a cross-sectional study carried out in Bushehr, Iran. 290 women from 10 public health centers were selected through stratified random sampling. Data were collected using a self-administered questionnaire from women within 12 weeks postpartum in 2019. PPD was assessed using Edinburgh Post Natal Depression Scale (EPDS), and score of >12 was considered having PPD.

***Results:*** The mean age of the respondents was 28.48 ± 5.50 years. The prevalence of depression was 24.1% in 12 weeks after delivery. Higher social support was associated with lower PPD [OR: 0.92, 95% CI: 0.88, 0.95; p<0.001]. The risk of developing PPD was 4.84 times higher in mothers with cesarean section [OR: 4.84, 95% CI: 1.89, 12.36; p =0.001], 5.19 times higher with preterm birth [OR: 5.19, 95% CI: 1.44, 18.27; p =0.01], 4.47 times higher with a history of depression [OR: 4.47, 95% CI: 1.40, 14.24; p =0.009]. The women who were satisfied with their marital relationship [OR: 0.16, 95% CI: 0.02, 0.96; p=0.04], and the baby's sleep habits [OR: 0.36, 95% CI: 0.15, 0.82; p =0.01] were less likely to suffer from PPD.

***Conclusion***

Postpartum depression was found common among mothers. The poor social support, poor marital relationship, cesarean section, preterm birth, positive history of depression, and adverse baby's sleep habits were associated with PPD. The vulnerable women should monitor their mental status and should be educated about the effective intervention strategies.

***Key Words:*** Child, Cultural, Factors, Postpartum Depression, Obstetric, Social.

*Please cite this article as: Najafi-Sharjabad F, Davani N, Rayani S, Mohammadi S. Evaluation of Sociocultural, Obstetric, and Child Related Factors Associated with Postpartum Depression in Bushehr, Southwest of Iran. Int J Pediatr 2021; 9(1): 12865-876. DOI: **10.22038/IJP.2020.50773.4036**

***Corresponding Author:***

Fatemeh Najafi-Sharjabad, Address: Salmane Farsi Street, Faculty of Health and Nutrition, Bushehr University of Medical Sciences, Bushehr, Iran, Fax: +98-7733450134.

Email: f.najafi@bpums.ac.ir AND najafi246@gmail.com

Received date: Aug.12, 2020; Accepted date: Nov.22, 2020

## 1- INTRODUCTION

Postpartum Depression (PPD) is one of the major psychiatric disorders worldwide that impairs maternal behaviors (1). PPD has adverse effect on children's emotional, cognitive, and behavioral development (1). PPD also increases abnormalities in infant character, maternal - newborn interaction and breastfeeding duration (2). According to American Psychiatric Association, PPD occurs during pregnancy or after birth up to 4 weeks postpartum (3). However, the onset of maternal depression symptoms can either start or continue within the first 12-month period postpartum at variable time frames (4). In most cases, high depressive risk was reported during the first 3–4 months postpartum (5, 6). PPD is characterized by hopelessness, tearfulness, feeling of guilt, emotional lability, poor concentration and memory, feelings of inadequacy, loss of appetite, irritability, suicidal ideation, fatigue, and sleep disturbances (7, 8). The resource-rich and resource-limited countries share the themes of PPD determinants cross-culturally (9). Studies from Malaysia, India, Pakistan, Turkey, and Nigeria have identified several possible risk factors associated with maternal postpartum depressive symptoms such as lower educational level, younger maternal age, history of depression, smoking during pregnancy, financial insecurity, lack of social support, poor marriage status, marital violence, protective influence of the various traditional rituals, child sex, negative life events, and antenatal depression and anxiety (9-12). A systematic review of 291 studies of 296,284 women from 56 countries showed the global pooled prevalence of PPD was 17.7%, ranging from 3% in Singapore to 38% in Chile. Countries with high rates of infant mortality, maternal mortality, income inequality, or women of childbearing age working ≥40 hours a week have a higher rate of PPD (1). A systematic review of 41 studies by Veisani et al. reported the pooled prevalence of PPD was 25.3% in Iran (13). There are very few studies on PPD and associated factors in Iran, no data is available in an urban area in South Iran. The aim of this study was to examine the prevalence and associated factors for PPD among mothers attending public health centers in Bushehr, in the southwest of Iran.

## 2- MATERIALS AND METHODS

### 2-1. Study design and setting

A cross-sectional study was carried out on 290 eligible postpartum women recruited from 10 public health centers in Bushehr from April to October 2019. The public health centers provide routine antenatal care, obstetric services, and postpartum care for mothers and childhood immunizations.

### 2-2. Inclusion and Exclusion Criteria

The inclusion criteria were willingness to participate in research, having minimum literacy, and Iranian nationality. The exclusion criteria were mental retardation and serious physical illness.

### 2-3. Sample Size

The sample size was determined using a single proportion formula. Based on a previous systematic review in Iran, the pooled prevalence of PPD was 25.3% (13). Calculating the precision of 0.05 with 95% confidence interval (CI), the sample size was calculated 290. Considering the non-response rate of 5%, the final sample size was 305.

### 2-4. Sampling Method

This study was carried out among women who presented to the public health centers for routine postpartum care within 12 weeks of delivery. There are 10 public health centers in Bushehr. The study population was selected using a stratified random sampling method. In the first step,

we identified the total number of women in all the health centers in Bushehr. As the number of women was unequal in different health centers, a list of postpartum women was obtained from SIB (Integrated Health Record System) of each health center and used as the sampling frame. Then, we divided the numbers of women of each stratum (health center) by the total number of the women to get the percentage. After that, we multiplied the percentage of each stratum by the desired sample size to get the required sample for each health center. Finally, from each stratum, women were randomly selected on the sample frame. Considering the inclusion criteria, telephone calls were made to ask eligible women to participate in the study. After providing informed consent, they were asked to complete the questionnaire on the day of follow-up for routine postpartum care.

### 2-5. Ethical Considerations

The Ethics Committee of the Bushehr University of Medical Sciences reviewed and approved the study protocol ID-code: IR.BPUMS.REC.1398.022. The objectives of the study were explained to the participants. From all postpartum women who agreed to participate in the study, verbal informed consent was obtained prior to their involvement in the research. Also, the respondents were assured of the confidentiality of their responses through the anonymity of the questionnaire. All the collected data were kept confidential and used only for study purposes.

### 2-6. Research Tools and Scoring

The research questionnaire contains 31 closed-ended questions in Persian in four sections: the first section deals with sociodemographic variables; the second section includes obstetric and child related variables; the third section contains sociocultural factors including social support and past psychiatric history. Multidimensional Scale of Perceived Social Support (MSPSS) which is a 12-item questionnaire developed by Zimet et al. (14) was used to measure social support from different sources including family (4 items), friends (4 items), and significant others (4 items). This instrument provides response options ranging from 0 to 6 (very strongly disagree to very strongly agree). The scores of all items in each sub scale were summed. The higher sum score indicates the greater social support. The Iranian version of the MSPSS is reliable, valid, and acceptable. Bagherian-Sararoudi et al. (2013) assessed the reliability, validity, and factor structure of MSPSS in Iranian population (15). The fourth section was Edinburgh Postnatal Depression Scale: EPDS is a 10- item self-report scale based on a 1-week recall. EPDS focuses on psychological symptoms of postnatal depression (16), and is mainly designed to screen for PPD in the community. Each item is scored on a 4-point scale from 0–3, providing a total score of 0-30. Seven items are reverse-scored. Higher scores indicate a greater severity of symptoms (17).

The cut-off score $\geq 10$ is considered as indicative of minor depression and $> 12$ was used to indicate major depression (16). In this study, scores of $> 12$ were used for the main analysis to maximize consistency with other studies (18). The question 10 is about suicide ideation "The thought of harming myself has occurred to me". Suicidal ideation" (SI) was examined via an answer of "Sometimes" or "Yes, quite often". No suicidal ideation was identified by responses of "hardly ever" or "never" (16). EPDS is a reliable and valid tool for screening postnatal depression among Iranian population. Its psychometric properties have been examined by several Iranian studies (19-21). The internal consistency of the scale was confirmed by four studies and Cronbach's alpha ranged from 0.7 to 0.79 for total EPDS score.

### 2-7. Statistical Analysis

We used IBM SPSS Statistics version 16.0 to analyze the data. The descriptive analysis included frequencies and percentages, means, and standard deviations. Both bivariate and multivariate techniques were applied to identify the factors associated with postpartum depression among women. The Chi-square test was used to determine the association among categorical variables. Independent sample t-test was applied to compare the means of the two groups of quantitative variables. The variables that were significant in the univariate analysis were re-examined in the multivariate analysis (binary logistic regression) in order to identify the significant predictors of postpartum depression after controlling other variables. Kolmogorov Smirnov test was used for checking normality of quantitative data. The assumption of normality was met for applying parametric tests. The significance level was set at $p< 0.05$.

## 3- RESULTS

### 3-1. Participant Characteristics

Out of 305 eligible invited women for study, 295 returned the questionnaire. Five questionnaires had incomplete information and were excluded from the study. Final response rate for the questionnaires was 95%. The sociodemographic, cultural, obstetric, and child characteristics of the study sample are shown in **Tables 1 and 2**. The age means of the respondents and their husbands were 28.48 ± 5.50 and 32.59± 5.57 years, respectively. Out of 290 postpartum women, 55 (19%) had under diploma, 98 (33%) had diploma, and 136 (47.2%) had university education. A majority of the women were housewife (80.1%). Regarding husband's education, 36 (12.5%) had under diploma, 75(26.1%) diploma, and 176 (61.3%) university education. Almost all husbands (97.9%) were employed. More than half of households had a monthly income between 20.000.000 to 30.000.000 Iranian Rials (IRR). About half of the women were primiparous, 31% were parity of two and 20.6% parity of ≥ 3 (multiparous). 13% of pregnancies were unwanted. Most women had cesarean section (63.8%), whereas 36% had normal vaginal delivery (NVD). 10.5% reported a positive past history of depression. A majority of women were satisfied with marital relationship. The baby health problem was reported by 15.3% of women. Nearly half of the women (49.5%) gave birth to male infant and 50.5% of the women delivered a female infant. Most women desired the baby's gender (92%). The feeding methods of the infants were breastfeeding (75.3%), bottle feeding (5%), both methods (19.7%). 71% of the mothers were satisfied with the baby's sleep habits, whereas 29% were not.

### 3-2. Prevalence of Postpartum Depression and Suicidal Ideation

The point prevalence of PPD was 24.1 % (n=70) within 12 weeks of childbirth. The mean Edinburgh Postnatal Depression Scale (EPDS) score was 8.42 ± 4.87 (total score= 30). Out of 290 women, 8 (2.8%) had suicidal ideation.

### 3-3. Factors Associated with Postpartum Depression

#### 3-3-1. Sociodemographic and Cultural Factors

**Table.1** shows the distribution of postpartum depression among women according to sociodemographic and cultural and psychiatric characteristics. Husbands' education level was significantly associated with women's PPD (p=0.02). Mothers with lower husband education had a higher risk of PPD. No significant association was found between PPD and age (p=0.41), husband's age (p=0.40), job (p=0.86), husband's job (p=0.27), education (p=0.61), and monthly income (p=0.07). As for sociocultural

factors, marital satisfaction (p<0.001), receiving support from family (p<0.001), friends (p=0.001), and significant others (p<0.001), and total social support (p<0.001) were significantly associated with PPD. No significant association was found between PPD and baby gender (p=0.253), and desired gender (p=0.442).

### 3-3-2. Obstetric, child related and psychiatric factors

The univariate analysis of obstetric and child related factors is shown in **Table. 2**. Several factors were found to be significantly associated with an increased risk of PPD, including higher number of abortion (p=0.045), multi parity (p=0.041), cesarean section (p=0.001), unwanted pregnancy (p<0.001), prematurity (p<0.001), twin pregnancy (p=0.021), low birth weight (p=0.003), bottle feeding of baby (p=0.045), and mothers' satisfaction with baby's sleep habits (p=0.002). Regarding psychiatric factors, the point prevalence of PPD was significantly higher (59.3%; p<0.001) among women who had a history of depression compared to those with no history of depression (19.7%).

**Table-1**: Socio-demographic and cultural factors associated with postpartum depression.

| Characteristics | Non depressed | Depressed | Total | P-value |
|---|---|---|---|---|
| | Number (%) | Number (%) | | |
| Age(Year) | 220 ( 75.9) | 70 (24.1) | 290(100) | 0.413 |
| M± SD | 28.33± 5.58 | 28.95±5.22 | | |
| Husband's Age | 220 ( 75.9) | 70 (24.1) | 290(100) | 0.402 |
| M± SD | 32.44 ± 5.54 | 33.08±5.60 | | |
| Job Status | | | | |
| Housewife | 176(76.5) | 55(23.5) | 231 (100) | 0.863 |
| Employed | 44(76.3) | 15(24.6) | 59(100) | |
| Husband's Job Status | | | | |
| Unemployed | 5 (83.3) | 1(16.7) | 6(100) | 0.274 |
| Government job | 118(79.7) | 31(20.3) | 148(100) | |
| Non-government job | 97(71.9) | 38(28.1) | 135(100) | |
| Education | | | | |
| Under diploma | 40(72.7) | 15(27.3) | 55(100) | 0.612 |
| Diploma | 33(74.5) | 25(25.5) | 98(100) | |
| University | 107(78.2) | 30(21.8) | 134(100) | |
| Husbands' Education | | | | |
| Under diploma | 22(61.1) | 14(38.9) | 36(100) | 0.02* |
| Diploma | 55(72.3) | 22(27.7) | 77(100) | |
| University | 143(80.8) | 34(19.2) | 177(100) | |
| Monthly Income | | | | |
| < 10,000,000 IRR** | 4(57.1) | 3(42.9) | 7(100) | 0.072 |
| 10,000,000-20,000,000 IRR | 54(68) | 26(32) | 80(100) | |
| 20,000,000- 30,000,000 IRR | 134(81.8) | 10(18.2) | 164(100) | |
| > 30,000,000 IRR | 29(74.4) | 10(25.4) | 39(100) | |
| Marital Satisfaction | | | | |
| Yes | 215(78.4) | 60(21.6) | 275(100) | < 0.001* |
| No | 5(33.3) | 10(66.7) | 15(100) | |
| Social Support Sources M± SD | | | | |
| Family | 23.78± 3.73 | 20.67±4.27 | 290(100) | <0.001* |
| Friends | 19.71±6.57 | 16.55± 6.28 | | <0.001* |
| Significant others | 24.11±3.53 | 21.77±4.16 | | 0.001* |
| Total Social Support | 67.63±10.90 | 58.88±11.36 | | <0.001* |
| *Significant level at p<0.05 | | | | |

**Table-۲**: Obstetric and child related factors associated with postpartum depression.

| Characteristics | Non depressed | Depressed | Total | P-value |
|---|---|---|---|---|
| | Number (%) | Number (%) | | |
| Number of live child/children | 220 ( 75.9) | 70 (24.1) | 290(100) | 0.139 |
| M± SD | 1.58± 0.81 | 1.76±0.93 | | |
| Number of abortion | 220 ( 75.9) | 70 (24.1) | 290(100) | 0.045* |
| M± SD | 0.25± 0.57 | 0.46±0.77 | | |
| Parity | | | | |
| Primipara | 110(77.5) | 32(22.5) | 142 (100) | 0.041* |
| Two | 43(76.3) | 16 (24.6) | 89(100) | |
| Multi | 38 (64.4) | 21 (35.6) | 59(100) | |
| Mode of delivery | | | | |
| NVD | 91 (87) | 14(13) | 105 (100) | 0.001* |
| Cesarean Section | 129 (69.7) | 56 (30.3) | 185 (100) | |
| Pregnancy desire | | | | |
| Desired | 201(79.7) | 51(20.3) | 252(100) | < 0.001* |
| Unwanted | 19 (50) | 19 (50) | 38(100) | |
| Type of delivery | | | | |
| Preterm birth | 16(45.5) | 20(55.5) | 36 (100) | < 0.001* |
| Term | 204 (80.3) | 50 (19.7) | 254 (100) | |
| Type of pregnancy | | | | |
| Single | 216 (77.2 ) | 64 (22.8) | 280(100) | 0.021* |
| Multiple birth | 4(40) | 6 (60) | 10 (100) | |
| History of depression | | | | |
| Yes | 13(40.7) | 19(59.3) | 32(100) | < 0.001* |
| No | 207(80.3) | 51(19.7) | 258(100) | |
| Birth Weight | | | | |
| ≥ 2500 gr | 208 (78.3) | 58 (21.7) | 266 (100) | 0.003* |
| < 2500 gr | 12 (50) | 12(50) | 24(100) | |
| Disease of infant | | | | |
| Yes | 31(68.9) | 14(31.1) | 45(100) | 0.314 |
| No | 189(77.5) | 56(22.5) | 245(100) | |
| Desired baby's gender | | | | |
| Yes | 204(76.7) | 63(23.3) | 267(100) | 0.442 |
| No | 16(69.6) | 7(30.4) | 23(100) | |
| Baby's feeding method | | | | |
| Breast feeding | 173(79.4) | 44(20.3) | 217(100) | 0.045* |
| Bottle feeding | 8(53.4) | 7(46.6) | 15(100) | |
| Both | 39(67.3) | 19(32.7) | 58(100) | |
| Mother's satisfaction with the baby's sleep habits | | | | |
| Yes | 167(80.7) | 40(19.3) | 207(100) | 0.002* |
| No | 53(63.9) | 30(36.1) | 83(100) | |
| *Significant level at p<0.05, SD: Standard deviation. | | | | |

**Table. 3** summarizes the results of the logistic regression analysis of the PPD predictors among the women. Hosemer-Lameshow Chi-square test yielded a p-value of 0.430, indicating that the model adequately fits the data. The whole model explained 47.7% (Nagelkerke R squared) of the variance of PPD, and appropriately categorized 83% of cases. As can be seen from **Table.3**, higher social support was associated with lower PPD [OR: 0.92, 95% CI: 0.88, 0.95; p<0.001]. As there is a unit increase in social support score, the risk of developing PPD decreases by 8%. The risk of developing PPD was 4.84 fold higher in mothers with cesarean section [OR: 4.84, 95% CI: 1.89, 12.36; p =0.001], and 5.19 times higher among the mother with preterm birth [OR: 5.19, 95% CI: 1.44, 18.27; p =0.01]. Those mothers who reported a history of depression were 4.47 times more likely to experience PPD [OR: 4.47, 95% CI: 1.40, 14.24; p =0.009]. In contrast, women who were satisfied with their marital relationship [OR: 0.16, 95% CI: 0.02, 0.96; p=0.04], and the baby's sleep habits [OR: 0.36, 95% CI: 0.15, 0.82; p =0.01] were less likely to develop PPD.

**Table-3:** Odd Ratio (OR) and 95% Confidence Interval (CI) for factors associated with postpartum depression among women.

| Variables | P-value | OR | 95% C.I. for EXP (B) | |
|---|---|---|---|---|
| | | | Lower | Upper |
| Husband's education | | | | |
| Under Diploma | 0.178 | 2.18 | 0.70 | 6.82 |
| Diploma | 0.154 | 1.99 | 0.77 | 5.18 |
| University (ref) | | 1.00 | | |
| Pregnancy desire | | | | |
| Desired | 0.423 | 0.62 | 0.19 | 2.01 |
| Unwanted (ref) | | 1.00 | | |
| Mode of delivery | | | | |
| Cesarean section | 0.001 | 4.84 | 1.89 | 12.36 |
| NVD (ref) | | 1.00 | | |
| Type of delivery | | | | |
| Preterm birth | 0.01 | 5.19 | 1.44 | 18.27 |
| Term (ref) | | 1.00 | | |
| Baby's feeding method | | | | |
| Breast feeding | 0.28 | 0.58 | 0.22 | 1.58 |
| Bottle feeding | 0.54 | 0.69 | 0.11 | 3.18 |
| Both (ref) | | 1.00 | | |
| Birth Weight | | | | |
| < 2500 gr | 0.82 | 0.81 | 0.13 | 4.83 |
| ≥ 2500 gr (ref) | | 1.00 | | |
| Parity | | | | |
| Primipara | 0.62 | 0.72 | 0.19 | 2.64 |
| Two | 0.33 | 0.53 | 0.15 | 1.89 |
| Multi (ref) | | 1.00 | | |
| Marital Satisfaction | | | | |
| Yes | 0.04 | 0.16 | 0.02 | 0.96 |
| No (ref) | | 1.00 | | |
| History of depression | | | | |
| Yes | 0.009 | 4.47 | 1.40 | 12.24 |
| No (ref) | | 1.00 | | |
| Mother's satisfaction with baby's sleep habits | | | | |
| Yes | 0.01 | 0.36 | 0.15 | 0.82 |
| No (ref) | | 1.00 | | |
| Abortion (continuous) | 0.347 | 1.39 | 0.69 | 2.76 |
| Total Social support(continuous) | <0.001 | 0.92 | 0.88 | 0.95 |

* Significant level at $p < 0.05$, **Ref= reference, CI= confidence interval, OR=odds ratio, Cox & Snell $R^2$ =0. 307; Nagelkerke $R^2$ = 0.477.

## 4- DISCUSSION

The aim of this study was to examine sociocultural, obstetric, and child-related factors associated with postpartum depression in Bushehr, in South West of Iran. This study found the prevalence of postnatal depression was 24.1% within the first 12 weeks postpartum among mothers in southwest of Iran. Studies from other public health settings in Iran have reported different rates of postpartum depression, ranging from 6.8% in the North to 48.7% in the West of the country (13). The results of the study showed that the prevalence of PPD was higher in Iran than other Asian countries like Malaysia 14.3% (23), Pakistan (22.3%) (24), and China (6.7%) (25). In a study in Turkey, the prevalence of PPD with a cut-off EDPS score ≥12 in the first and second month of childbirth was reported 14% and 17%, respectively (26). Alhammadi et al. reported a prevalence rate of 33% among Saudi

women with EPDS score > 10, which was higher than our study (27). Studies from other countries and diverse cultural settings have documented postpartum depression prevalence rates of 15% in Australia (28), 18.4% in Argentina (29), 6.38% in Poland (30), and 13% in Sweden, all of which were lower than our study. The possible explanation for this difference may be due to the assessment tools, the applied cut-off point of the EDPS, different setting, and culture (13, 31). Suicidal ideation is one of the strongest predictors of suicide attempt and completion (32). The prevalence of suicidal ideation in the present study was 8 (2.8%) which is similar to Alhammadi's study in United Arab Emirates (27), and lower than Pham's study in Argentina (4.3%) (29); the identification of the vulnerable groups and determining factors in attempted or completed suicide is required to develop a comprehensive prevention strategy (29).

Cultural factors like social support, marital satisfaction, and baby gender are well documented as the predictors of PPD (9, 33, 34). In this study, poor social support was found to be a significant risk factor in developing postpartum depression. Previous studies from India and Turkey have consistently reported this finding (9, 33). In Iranian community, psychological and physical support of new mothers during the first weeks postpartum by close family members and relatives is a common practice, which can facilitate the process of adjustment to motherhood (35).

The present study further showed that a greater proportion of the women in the depressed group were unsatisfied with their marital relationship as compared to the non-depressed group. Marital dissatisfaction is usually attributed to poor spouse support, which could increase the risk of postpartum depression (36). Based on cultural and traditional norms, studies conducted in Eastern countries have indicated that there is a relationship between PPD and baby's gender, while studies from Western communities have not reported such a relationship (7). In countries like Turkey and India, male babies are preferred over females, implying that male gender is considered as the workforce which could financially support the family in the future (9, 33). Our study revealed no significant relationship between gender of the baby, the desired sex of child and PPD. The possible explanation is that the attitude toward women has recently changed as there has been an increase in the number of women in workforce (33).

Our results indicate that multiparty was significantly associated with PPD. Similarly, other studies from Turkey and India have documented high parity increases the risk of postnatal depression. Women with high parity should not only satisfy the needs of the newborn but also look after her other children and this situation may act as an additional burden for the postpartum woman (33). Previous studies have identified operative procedures and difficult labor as risk factors for postpartum depression (9, 37).

63.8% of the women in our study had caesarean delivery, which is much higher than the global average rate of CS (18.6%), (38); surprisingly, in spite of changing health policy in Iran and promoting natural childbirth by health system from 2014 (39), the rate of cesarean section still remains high. The women who go under operative procedure like cesarean section are more likely to develop PPD. Caesarean delivery is thought to be linked with depressive symptoms during pregnancy and the fear of childbirth, thus impacting the postpartum rate of PPD (40). There is a potential mechanism underlying the association between CS and the risk of PPD. CS might cause adverse physiological effects such as postpartum

hemorrhage, infection, and uterine rupture. These surgical trauma and adverse effects might increase stress, which in turn affects the psychological function and enhances the risk of PPD (38). Preterm delivery was found as a significant contributing factor to the development of postpartum depression.

The association between preterm birth and PPD may be explained by early parental stress and mother-infant interactions. Immediate postpartum period and stressful life events may impact a woman's ability to make the appropriate adjustments during the transition to motherhood and therefore increase the likelihood of PPD (31, 41). Several studies have reported the adverse mental health outcomes of unwanted pregnancy in women (24, 33).

Besides mortality and the morbidity related to unplanned pregnancy, PPD was found to be the other adverse result of unwanted pregnancy (33). Inconsistent with Hedge's study in India, we found a higher proportion of women in the depressed group had unwanted pregnancy as compared to the non- depressed group. Breastfeeding is critically important for the formation of the mother-child relationship as well as the child's physical and emotional development (33). The present results indicated a significant relationship between baby's feeding method and PPD.

Compatible with Pocan's findings in Turkey, a higher proportion of mothers who used bottle-feeding were found to be depressed as compared to those that used breastfeeding. In contrast, a study in the United States showed that negative early breastfeeding experiences and breastfeeding difficulty were linked to depressive symptoms in 2 months postpartum (33). Therefore, mothers with early breastfeeding difficulties should be screened, treated, and enabled to meet their breastfeeding goals. In this study, those mothers who were not satisfied with the baby's sleep habits were more depressed. Shorter, more interrupted infant's sleep and more frequent feedings would contribute to more maternal sleep disruption and higher postpartum depression (43). A history of psychiatric illness is well known as a risk factor of PPD. We showed that a significantly higher proportion of the women in the depressed group had a positive history of depression, which confirmed previous studies in Turkey and Saudi Arabia (33, 44).

### 4-1. Study Limitations

Our study had some limitations. Since the study was limited to 12 weeks postpartum, depression beyond the first few postnatal months was not investigated. Furthermore, obtaining information on previous history of depression was based on self-report which can lead to recall bias.

## 5- CONCLUSION

Overall, the prevalence of depression was 24.1% in 12 weeks after delivery. Low social support, unsatisfied marital relationship, cesarean section, preterm birth, having a history of depression, and the poor sleep habits of baby were significantly associated with PPD. The mental health of the vulnerable women requires careful monitoring. Special attention needs to be directed to mothers who are suffering from poor social support, poor marital relationship, cesarean section, preterm birth, positive history of depression, and undesirable babies sleep habits because they are more likely to develop PPD. It is strongly suggested that a cognitive behavioral intervention be designed by trained community health workers in order to alleviate the maternal depressive symptoms.

## 6- ACKNOWLEDGMENTS

The authors gratefully acknowledge financial support from Research and Technology Affairs, Bushehr University of Medical Sciences (BUMS). The authors would also like to thank all the health staff

in the public health centers in Bushehr for their assistance to recruit participants and coordination of data collection.

## 7- CONFLICT OF INTEREST: None.

## 8- REFERENCES

1. Hahn-Holbrook J, Cornwell-Hinrichs T, Anaya I. Economic and health predictors of national postpartum depression prevalence: a systematic review, meta-analysis, and meta-regression of 291 studies from 56 countries. Front Psychiatry. 2018;8:248.

2. Field T. Postpartum depression effects on early interactions, parenting, and safety practices: a review. Infant Behav Dev. 2010;33(1):1-6.

3. Emerson MR, Mathews TL, Struwe L. Postpartum depression screening for new mothers at well child visits. Am J Matern Child Nurs. 2018;43(3):139-45.

4. Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. Obstet Gynecol. 2005;106(5):1071-83.

5.Verkerk GJ, Pop VJ, Van Son MJ, Van Heck GL. Prediction of depression in the postpartum period: a longitudinal follow-up study in high-risk and low-risk women. J Affect Disord. 2003;77(2):159-66.

6. Sheeder J, Kabir K, Stafford B. Screening for postpartum depression at well-child visits: is once enough during the first 6 months of life? Pediatrics. 2009;123(6):e982-e8.

7. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. Gen Hosp Psychiatry. 2004;26(4):289-95.

8. Mc-Garry J, Kim H, Sheng X, Egger M, Baksh L. Postpartum depression and help-seeking behavior. J Midwifery Womens Health. 2009;54(1):50-6.

9. Hegde S, Latha K, Bhat SM, Sharma P, Kamath A, Shetty A. Postpartum depression: prevalence and associated factors among women in India. J Women's Health, Issues Care. 2012;1(1):1-7.

10. Golbasi Z, Kelleci M, Kisacik G, Cetin A. Prevalence and correlates of depression in pregnancy among Turkish women. Matern Child Health J. 2010;14(4):485-91.

11. Ohara MW, McCabe JE. Postpartum depression: current status and future directions. Annu Rev Clin Psychol. 2013;9:379-407

12. Dagher RK, Shenassa ED. Prenatal health behaviors and postpartum depression: is there an association? Arch Womens Ment Health. 2012;15(1):31-7.

13. Veisani Y, Delpisheh A, Sayehmiri K, Rezaeian S. Trends of postpartum depression in iran: a systematic review and meta-analysis. Depress Res Trea. 2013; 2013: 291029

14. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. J Pers Assess.1988;52(1):30-41.

15. Bagherian-Sararoudi R, Hajian A, Ehsan HB, Sarafraz MR, Zimet GD. Psychometric properties of the Persian version of the multidimensional scale of perceived social support in Iran. Int J Prev Med. 2013;4(11):1277.

16. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. Brit J Psychiat. 1987;150(6):782-6.

17. Gibson J, McKenzie-McHarg K, Shakespeare J, Price J, Gray R. A systematic review of studies validating the Edinburgh Postnatal Depression Scale in antepartum and postpartum women. Acta Psychiatrica Scandinavica. 2009;119(5):350-64.

18. Matthey S, Henshaw C, Elliott S, Barnett B. Variability in use of cut-off scores and formats on the Edinburgh Postnatal Depression Scale–implications for clinical and research practice. Arch Womens Ment Health. 2006;9(6):309-15

19. Mazhari S, Nakhaee N. Validation of the Edinburgh postnatal depression scale in an Iranian sample. Arch Womens Ment Health. 2007;10(6):293-7.

20. Montazeri A, Torkan B, Omidvari S. The Edinburgh Postnatal Depression Scale

(EPDS): translation and validation study of the Iranian version. BMC psychiatry. 2007;7(1):11.

21. Ahmadi kani Golzar A, GoliZadeh Z. Validation of Edinburgh Postpartum Depression Scale (EPDS) for screening postpartum depression in Iran. IJPN. 2015;3(3):1-10.

22. Rahmani Ivary F, Fanaei S, Ghahremani S, Falah Ardizi N, Abdollahpour N, Khorsandi F, et al. A Systematic Review of Psychometric Properties of the Edinburgh Postnatal Depression Scale in Iranian Population. Int J Pediatr. 2019;7(5):9497-505.

23.Yusuff ASM, Tang L, Binns CW, Lee AH. Prevalence and risk factors for postnatal depression in Sabah, Malaysia: a cohort study. Women and Birth. 2015;28(1):25-9.

24.Tikmani SS, Soomro T, Tikmani P. Prevalence and determinants of postpartum depression in a tertiary care hospital. Austin Journal of Obstetrics and Gynecology. 2016;3(2): 1057-61

25. Liu S, Yan Y, Gao X, Xiang S, Sha T, Zeng G, et al. Risk factors for postpartum depression among Chinese women: path model analysis. BMC Pregnancy Childbirth. 2017;17(1):133.

26. Oztora S, Arslan A, Caylan A, Dağdeviren H. Postpartum depression and affecting factors in primary care. Niger J Clin Pract. 2019;22(1). 85-91

27. Alhammadi SM, Hashem LA, Abusbeih ZR, Alzaabi FS, Alnuaimi SN, Jalabi AF, et al. Predictors of postpartum depression in Dubai, a rapidly growing multicultural society in the United Arab Emirates. Psychiatr Danub. 2017;29(Suppl 3):313-22.

28. Chojenta CL, Lucke JC, Forder PM, Loxton DJ. Maternal health factors as risks for postnatal depression: a prospective longitudinal study. PloS one. 2016;11(1): e0147246

29. Pham D, Cormick G, Amyx MM, Gibbons L, Doty M, Brown A, et al. Factors associated with postpartum depression in women from low socioeconomic level in Argentina: a hierarchical model approach. J Affect Disord. 2018; 227:731-8.

30. Maliszewska K, Swiatkowska-Freund M, Bidzan M, Preis K. Screening for maternal postpartum depression and associations with personality traits and social support. A Polish follow-up study 4 weeks and 3 months after delivery. Psychiatr Pol. 2018;52(5). 889–98.

31. Gulamani SS, Premji SS, Kanji Z, Azam SI. A review of postpartum depression, preterm birth, and culture. J Perinat Neonatal Nurs. 2013;27(1):52-9.

32. Joiner Jr TE, Rudd MD, Rouleau MR, Wagner KD. Parameters of suicidal crises vary as a function of previous suicide attempts in youth inpatients. J Am Acad Child Adolesc Psychiatry. 2000;39(7):876-80.

33. Pocan AG, Aki OE, Parlakgümüs AH, Gereklioglu C, Dolgun AB. The incidence of and risk factors for postpartum depression at an urban maternity clinic in Turkey. Int J Psychiatry Med. 2013;46(2):179-94.

34. Ozmen D, Cetinkaya AC, Ulas SC, Ozmen E. Association between perceived social support and postpartum depression in Turkey. Journal of Advances in Medicine and Medical Research. Br J Med Med Res.2014; 4(10): 2025-36.

35. Abdollahpour S, Ramezani S, Khosravi A. Perceived social support among family in pregnant women. Int J Pediatr. 2015; 3(5): 879-88.

36. Savarimuthu R, Ezhilarasu P, Charles H, Antonisamy B, Kurian S, Jacob K. Post-partum depression in the community: a qualitative study from rural South India. Int J Soc Psychiatry. 2010; 56(1):94-102.

37. Xu H, Ding Y, Ma Y, Xin X, Zhang D. Cesarean section and risk of postpartum depression: a meta-analysis. J Psychosom Res. 2017;97:118-26.

38. Betran AP, Ye J, Moller A-B, Zhang J, Gulmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. PloS one. 2016;11(2): e0148343.

39. Shahshahan Z, Heshmati B, Akbari M, Sabet F. Caesarean section in Iran. The Lancet. 2016;388(10039):29-30.

40. Najafi-Sharjabad F, Keshavarz P, Moradian Z. Survey on the prevalence and

influencing factors for choosing Normal vaginal delivery among pregnant women in Bushehr City, 2015. Community Health J. 2018;11(1):20-9.

41. Gray PH, Edwards DM, O'Callaghan MJ, Cuskelly M, Gibbons K. Parenting stress in mothers of very preterm infants influence of development, temperament and maternal depression. Early Hum. Dev. 2013; 89(9): 625-9.

42. Watkins S, Meltzer-Brody S, Zolnoun D, Stuebe A. Early breastfeeding experiences and postpartum depression. Obstet Gynecol. 2011;118(2):214-21.

43. Sharkey KM, Iko IN, Machan JT, Thompson-Westra J, Pearlstein TB. Infant sleep and feeding patterns are associated with maternal sleep, stress, and depressed mood in women with a history of major depressive disorder (MDD). Arch Womens Ment Health. 2016;19(2):209-18.

44. Al-Anazi W, Al-Amri E, Al-Hayan S, Al-Bibi R, Shammari HA, Al-Rushaydan M, et al. Postpartum Depression among Saudi Women at National Guard Hospital and Alyamama Hospital in Riyadh in 2014-2015. EJHM. 2018;70(10):1794-800.