Postpartum Mental Health in First-Time Mothers: A Cohort Study

Fatemeh Abdollahi,[1] Mouloud Agajani-Delavar,[2] Mehran Zarghami,[3,4] and Munn-Sann Lye[5,*]

[1]Public Health Department, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Mazandaran, IR Iran
[2]Department of Midwifery, Faculty of Nursing, Fatemezahra Infertility and Reproductive Health Research Center, Babol University of Medical Sciences, Babol, Mazandaran, IR Iran
[3]Department of Psychiatry, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Mazandaran, IR Iran
[4]Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Mazandaran, IR Iran
[5]Department of Community Health, Faculty of Medicine and Health Sciences, University of Putra Malaysia, Serdang, Malaysia

Corresponding author: Munn-Sann Lye, Department of Community Health, Faculty of Medicine and Health Sciences, University of Putra Malaysia, Serdang, Malaysia. Tel: +60-123083186, Fax: +60-389472410, E-mail: lyems9@yahoo.com

Abstract

Background: Post-partum depression (PPD) can produce adverse symptoms that make motherhood one of the most tumultuous events in a female's life. First-time mothers who have problems adapting themselves to the mother's role are more vulnerable to PPD.

Objectives: The current study aimed to explore the extent of social support and parental self-efficacy on PPD, this study was conducted among the first-time pregnant women.

Patients and Methods: A prospective cohort study assessed the depressive symptoms and related factors among 838 first-time not depressed pregnant women from third trimester of pregnancy to 12 weeks postpartum who attended primary health centers (Jan to July 2009). The study employed Edinburgh postnatal depression scale, social support appraisals scale, network orientation scale, marital inventory, parental expectation survey and socio-demographic questionnaires. Logistic regression was used for data analysis.

Results: The incidence of depression was 10.7% at three months post-partum. The adjusted odds ratio showed the PPD was associated with perceived social isolation (OR = 1.06; 95% CI = 1.01 - 1.12), lack of marital satisfaction (OR = 0.91; 95% CI = 0.86 - 0.97) and low parental self-efficacy (OR = 0.74; 95% CI = 0.65 - 0.85).

Conclusions: A high incidence of PPD was identified among the first-time mothers which makes PPD one of the major health problems in females. The important effects of perceived social isolation, maternal parental self-efficacy, and marital satisfaction on reducing the risk of PPD should be considered.

Keywords: Cohort Study, Marital Satisfaction, Maternal Parental Self-Efficacy, Post-Partum Depression, Social Support

1. Background

Post-partum depression (PPD) is a significant health issue for the whole family members (1) with prevalence of 60% in some countries (2). The limited number of studies on the incidence of PPD reported that 6.5% of females develop a new episode of depression during the first three months after delivery (3). It can influence females' lives and their beliefs to take care of their newborns. Numerous researches indicate that these infants are at risk and probably suffer from uncertain affection and diminish psychomotor and cognitive development (4-7). Child birth is a significant transition event in life and support at this stage can potentially affect females' mental status after delivery (8). When females receive support from specific persons, family members and acquaintances during stressful situations, they are protected against PPD (9-13). Sudden psychosocial fluctuations within motherhood and its challenges coupled with stresses could be other factors that may trigger PPD (14). Difficulties in interpersonal relationships, particularly when emotional and practical supports are not provided to females, increase the risk of PPD development (15). Low maternal confidence in infant care is another significant risk factor for PPD (16, 17). Kapp (18) found that primipara females had lower confidence with infant care than multiparas. First-time mothers who experience more anxiousness and have problems of adaptation regarding the role of motherhood are more susceptible to PPD (17, 19, 20).

2. Objectives

Although becoming a mother for the first time is a major developmental transition of adulthood and social support accompany with maternal parental self-efficacy could influence females' mental health, the relationship

between these two factors and PPD specifically in this group of females in the previous conducted studies in Iran has been neglected; hence, this longitudinal research design permits identification of sociological risk factors for PPD to distinguish females at risk for the first time in Iran.

3. Patients and Methods

This article is based on results of a large cohort study which examined the risk factors of PPD among Iranian females. The first and second specific aims of this study were to determine incidence of PPD and explore the probable sociological risk factors that predispose females to PPD at 12 weeks post-partum. This study was conducted on 16 - 45 year-old, literate, singleton, pregnant and first-time mothers, who were at high risk for PPD at 12 weeks post-partum, attending rural and urban primary health-care centers (PHCs) of Mazandaran province. Since this is an incidence study, females whose Edinburgh postnatal depression scale (EPDS) (21) result during third trimester of pregnancy exceeded 12 and used psychiatric medication were excluded from the study. The samples of this study were drawn from the total population of 9187 (4684 in urban and 4503 in rural) pregnant females at third trimester of pregnancy selected by convenience sampling method from January to July 2009. The potential risk factors (indicators) in the 32 - 42 weeks of pregnancy and after birth were utilized to estimate the risk of PPD. the study was approved by the medical ethics committees of University Putra Malaysia (UPM) and Mazandaran University of Medical Sciences (MAZUMS) in Iran. At the initial contact, written consent was obtained from all eligible females in this study.

3.1. Data Collection

The dependent variable was PPD measured by EPDS. The independent variables included social support or lack of support measured by the social support appraisal scale (SSA) and network orientation scale (NOS) (22, 23), marital relationship and maternal parental self-efficacy as measured by the index of marital inventory (MI) (ENRICH) (24), parental expectation survey (PES) (25) and socio-economic status (SES). Generally, income, occupational status and educational level were evaluated based on SES. For data collection, self-report questionnaires were distributed among eligible females attending the PHCs for prenatal care by researchers and educated health care practitioners. Socio-demographic questionnaire sought information regarding age, age at marriage, level of education, occupation and income regarding females and their husbands. This questionnaire also included information on family structure and housing condition. The females were divided into three categories by household incomes for five people according to Iranian ministry of finance report at the data collection time. Concerning obstetrics related data, the authors asked four questions include gravida, type and place of delivery and birth weight. EPDS was used to determine the probable experience of PPD. EPDS is the most widely used screening tool to detect females with PPD. It consists of 10 items relating to mood and can be usually completed in less than five minutes (26). The subjects were scored from zero to three ("no, not at all" to "yes, quite often") according to the severity of symptoms during the past week. The total score was calculated by computing the scores for the 10 items with seven (3, 5, 6, 7, 8, 9, 10) of the 10 items being scored reversely. Reliability of this instrument is verified in Iran, and the score of 12 is established as a cut-off point (27). SSA is a 23 item instrument created based on the notion that social support is really a support only if the person thinks it exists. Each Likert item has four responses from strongly agree (one) to strongly disagree (four). The scoring procedure is done by scoring each item from one to four except items 3, 10, 13, 21, and 23 that are scored reversely. Then all items are summed to obtain a total score. In this evaluation, lower scores demonstrate stronger social support. This measure is sufficiently reliable and valid to assess social support (28). Vaux designed a 20 item instrument called NOS to measure negative network orientation and to assess the individual's unwillingness to keep, look after, or employ the kind of support that she has (23). In order to properly analyze NOS items, both negative and positive words are used. Items 3, 5, 8, 10, 12, 13, 15, 17, 18, and 20 are negatively worded and are reversely-scored. Each Likert item has four responses from strongly agree (one) to strongly disagree (four) then all items are calculated to obtain a total score. The higher score demonstrates more negative orientation. NOS is a sufficiently reliable and valid instrument to assess network orientation (28). ENRICH marital inventory consists of 115 items to evaluate marital relationship. This inventory is grouped into fourteen subscales; items 6 to15 is concerned with marital satisfaction. It is a Likert tool that respondents choose from strongly agree to strongly disagree. The ENRICH is scored by summing up the scores of all items ranging from zero to four. The maximum score in this inventory is 60. The higher score indicates a better marital relationship. Many researchers reported that ENRICH instrument is reliable and valid to investigate marital satisfaction (24, 29). This instrument has acceptable properties to be used in Iran (30). PES is a 25 item Likert type questionnaire designed by Reece to measure females' understanding regarding their capability to care for their newborn. All questions have 10 responses from cannot do (zero) to certainly can do (10). After calculating all scores and dividing by total number

of questions (25), the mean score is determined. Higher scores indicate the females' higher self-efficacy (25). SSA (31), MI (32) and EPDS (27) were previously used in Iran, and their validities were established. NOS and PES were translated into Persian, then back-translated for verification and were evaluated by 10 specialists in MAZUMS. All questionnaires were pretested with a sample of 60 healthy pregnant women and internal consistency coefficients (Cronbach's alpha) were calculated. PES had a very good internal consistency, with Cronbach's alpha of 0.91. The Cronbach's alpha for NOS, MI, SSA and EPDS were 0.77, 0.73, 0.59 and 0.53, respectively. The last two questionnaires were used after some corrections.

3.2. Statistical Analysis

The data were transferred to IBM SPSS statistical package, version 20. In order to predict depressive symptoms at 12.weeks postpartum as gauged by EPDS > 12, a sequential logistic regression analysis was conducted. Variables were examined in univariate analysis model one by one and corresponding odds ratio (OR) and 95% confidence intervals were obtained. Then the variables that were statistically significant in univariate analysis were examined in the backward analysis and kept in the model if the p-value was 0.05 or less.

4. Results

Out of 1,231 first-time mothers recruited within 32 - 42 weeks of pregnancy, 248 (20.1%) had EPDS scores above 12. Females who were not depressed during this period (983; 79.9%) were followed up to ascertain new occurrence of depression at 12 weeks post-partum with response rate of 85.2% (838).

Table 1 describes the socio-demographics of the participants in this study. The mean age and marital age of the subjects were 23.5 ± 4.1 and 20.7 ± 3.9 years, respectively. The mean scores of social support and non-social support based on SSA and NOS were 47.0 ± 4.8 and 47.7 ± 4.2 respectively. The subjects' mean scores of relationship satisfaction based on MI and self-efficacy about parenting based on PES were 25.0 ± 3.5 and 7.8 ± 1.5, respectively. The incidence rate of depression at 12 weeks after delivery was 10.7% (n = 90) with a mean of 7.3 ± 4.38.

Among the demographic variables, only better education was associated with lower odds of elevated EPDS scores in the univariate model. The risk of PPD increased in subjects who had given up their education at lower secondary and upper secondary levels by 2.75 (95% CI: 1.11 - 6.79) and 2.58 (95% CI: 1.08 - 6.17) respectively compared

Table 1. The Socio-Demographics of the Subjects[a]

Variable	No. (%)
Age, y	
< 25	537 (64.1)
≥ 25	301 (35.9)
Age at marriage, y	
< 25	721 (86)
≥ 25	117 (14)
Education, y	
Lower secondary (≤ 9)	254 (30.3)
Upper secondary (10 - 12)	459 (54.8)
Completed high school (> 12)	125 (14.9)
Husband's education, y	
Lower secondary (≤ 9)	306 (36.5)
Upper secondary (10 - 12)	395 (47.1)
Completed high school (> 12)	137 (16.3)
Family structure	
Extended	273 (32.6)
Nuclear	565 (67.4)
Employed	
Housewife	796 (95)
Employed	42 (5)
Housing	
Tenant	365 (44)
Owner	469 (56)
Husband's job	
Business	79 (9.4)
Governmental servants	600 (71.6)
Farmer and others	159 (4.7)
Total household income, Rials/mon	
Low (less than 3,500,000)	540 (64.4)
Medium (3,500,000 - 4,500,000)	195 (23.3)
High (more than 4,500,000)	102 (12.3)
Location of healthcare center	
Rural	413 (49.3)
Urban	425 (50.7)

[a] n = 838.

with the ones who completed their high school. Concerning delivery related data, no differences were observed between depressed and not depressed groups, except delivery at private hospital that was a predictor of increased risk

of PPD with higher odds of 1.91 (95% CI: 1.14 - 3.20).

The increased risk of PPD was 1.07 (95% CI: 1.01 - 1.12) for subjects with elevated social isolation scores based on NOS. Reversely, a decreased risk of PPD was observed in subjects who were more satisfied with their marital relationship and in the ones with higher postpartum parenting self-efficacy by 0.90 (95% CI: 0.85 - 0.96), and 0.74 (95% CI: 0.65 - 0.84), respectively (Table 2).

Most of the variables that had shown statistically significant effects on PPD in the univariate model were also significant in the multivariate model. Backward elimination resulted in a model that retained social isolation, lack of marital satisfaction and lower parental self-efficacy. Expressed in logit model, the regression formula was:

$$\text{Elevated EPDS} = -1.10 + 1.06 \times \text{NOS} + 0.91 \times \text{MI} + 0.74 \times \text{PES} \tag{1}$$

Table 3 represents the independent effects of each explanatory variable when all others were controlled for.

5. Discussion

In this prospective design, incidence rate and associated predictors of depression over twelve weeks postpartum were explored among the first- time mothers. Although the prevalence of PPD is studied, few studies explored the incidence of PPD (33). The incidence of PPD during three months post-partum was not uncommon among first- time mothers (10.7%) in the current study. This rate was consistent with the incident rate reported in Spain (9.3%) (34) and Chinese first-time mothers (13%) (35), but exceed 5.3% and 3.5% at the same time period and using the same measurements in the United Kingdom (34, 36, 37). O'Hara and Swain (38) stated that the probable rate of PPD is predominant in the first three months post-partum. The variety in the range of PPD is unpredictably wide because it depends on many factors such as sample sizes and sampling methods, differences in PPD symptom definition and expression and the time the depression is evaluated (2). In the present study, increased support was not statistically associated with reduced risk of PPD as reported in some other studies (34, 39, 40). Shaw et al. (41) reviewed 25 studies to examine the effectiveness of post-partum support programs to improve maternal mood from immediately after birth to one year post-partum, and documented that universal provision of post-partum support could not improve maternal mental health. However, there are some evidences indicating that females at high risk for either family dysfunction or PPD could benefit from post-partum support especially peer support that produced a statistically significant reduction in EPDS scores (41). The present

study was an opportunity to assess both social support and social isolation to evaluate the support milieu. In agreement with other studies that indicate females who experienced social isolation from family, friends, or partner during pregnancy had an increased risk of PPD (42-44), the current study revealed that the perceived social isolation is associated with PPD. In a prospective Danish study (n = 5,091) perceived social isolation was the most significant predictor of PPD, and one out of three females with perceived social isolation developed PPD (42). During statistical process of modeling in the current study, social isolation was surprisingly a predictor of PPD, while social support was not. A possible explanation for this phenomenon could be that social isolation is a significant negative aspect of social support as a predictor of PPD. However, this study failed to describe details of social support. Sources of this support were hypothesized to be most influential (45). Another issue which was not examined in the present study and thus needs further investigation was the satisfaction regarding the experienced support. In a study carried out in Mexico, Martinez-Schallmoser et al. (46) showed that females with unfulfilled desire for support and paradoxically those who had over protective surroundings and believed to have excessive support, felt isolated much more and were more vulnerable to PPD. Marital satisfaction was a factor related to scoring on EPDS in this study. One of the most dominant PPD risk factors, that are frequently studied, is marital dissatisfaction (34, 47, 48). Poor marital relationship, such as inability to confide in a partner, may contribute to post-partum depression (49). A qualitative study among Jordanian-Australian females revealed that the ones with less supportive and understanding partners were more prone to depression (50). A review study in Middle East and Asian countries found that females in United Arab Emirates (UAE), Hong Kong, Turkey and India, who had marital conflicts, were more prone to PPD. There are occasions in one's personal life, for instance during post-partum period, when a female yearnings support from a close and trusting partner (51). Encountering difficulties in the interpersonal relationship, particularly when emotional and practical supports are not provided, is prone to increase the risk for PPD development (15). One should not be ignored, is the effect of parenthood capability in relation to females' psychosocial performance (52). The findings of the current study showed that low self-efficacy was a risk factor for depression over 12 weeks of post-partum, were consistent with those of earlier studies, which found the association between the lack of postnatal parental competence with PPD (43, 53). As the females under the current study were the first-time mothers and perhaps had no previous childcare experience, it could be possible that this group experienced more stress when they began to

Table 2. Factors Associated With Depression at 12 Weeks Post-Partum in the First Time Mothers Using Simple Logistic Regression[a]

Risk Factors	EPDS $\leq$ 12	EPDS > 12	OR	95% (CI)	P Value[b]
Education, y					
$\leq$ 9	223	31	2.75	1.11 - 6.79	0.020
10 - 12	406	53	2.58	1.08 - 6.17	0.030
$\geq$ 12	119	6			
Place of delivery					
Private hospital	115	23	1.91	1.14 - 3.20	0.010
State hospital	632	66			
Marital satisfaction from MI	748	90	0.90	0.85 - 0.96	0.001
Social isolation from NOS	746	90	1.07	1.01 - 1.12	0.010
Parental self-efficacy from PES	740	89	0.74	0.65 - 0.84	0.001

Abbreviations: EPDS, Edinburgh postnatal depression scale; MI, ENRICH marital inventory; NOS, network orientation scale; OR, odd ratios; PES, parental expectation survey.
[a]n = 838.
[b]Results are from simple logistic regression.

Table 3. Factors and Risks of Depression at 12 Weeks Post-Partum Using Multiple Logistic Regressions[a]

Risk Factors	Adjusted OR	95% CI	P Value[b]
Social isolation from NOS	1.06	1.01 - 1.12	0.010
Marital satisfaction from MI	0.91	0.86 - 0.97	0.004
Parental self-efficacy from PES	0.74	0.65 - 0.85	0.001
Constant	-1.10		

Abbreviations: MI, ENRICH marital inventory; NOS, network orientation scale; OR, odd ratios; PES, parental expectation survey.
[a]n = 828.
[b]Results are from multiple logistic regressions.

care for the baby (54). This could also be as the result of not being prepared for mothering from pregnancy (55). To the authors' best knowledge, this cohort study for the first time evaluated sociological predictors of PPD among the first-time mothers using both univariate and multivariate analyses while controlling the symptoms of depression in the pregnancy. The incidence of PPD in the first-time mothers was high. Perceived social isolation, maternal parental self-efficacy and marital satisfaction stress exposure contributed to PPD. These findings emphasize the importance of health care providers, family, particularly their partner and own mothers' support to first-time mothers to enhance maternal parental self-efficacy and their mental health. The current study findings cannot be generalized to the entire population, since the sample under study were just first-time mothers. In addition, much of the data from the females were self-reporting. Although most studies indicate a high validity of the EPDS, it would have been ideal to confirm depression in females with increased EPDS scores by diagnostic interview schedule, version III, revised (DIS). Another limitation was lack of data on other risk factors such as psychological elements.

Acknowledgments

Footnotes

References

1. Ross LE, Campbell VL, Dennis CL, Blackmore ER. Demographic characteristics of participants in studies of risk factors, preven-

tion, and treatment of postpartum depression. *Can J Psychiatry.* 2006;**51**(11):704–10. [PubMed: 17121169].

2. Halbreich U, Karkun S. Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. *J Affect Disord.* 2006;**91**(2-3):97–111. doi: 10.1016/j.jad.2005.12.051. [PubMed: 16466664].

3. Lusskin SI, Pundiak TM, Habib SM. Perinatal depression: hiding in plain sight. *Can J Psychiatry.* 2007;**52**(8):479–88. [PubMed: 17955909].

4. Rahman A, Iqbal Z, Bunn J, Lovel H, Harrington R. Impact of maternal depression on infant nutritional status and illness: a cohort study. *Arch Gen Psychiatry.* 2004;**61**(9):946–52. doi: 10.1001/archpsyc.61.9.946. [PubMed: 15351773].

5. Josefsson A, Sydsjo G. A follow-up study of postpartum depressed women: recurrent maternal depressive symptoms and child behavior after four years. *Arch Womens Ment Health.* 2007;**10**(4):141–5. doi: 10.1007/s00737-007-0185-9. [PubMed: 17533557].

6. Stewart RC. Maternal depression and infant growth: a review of recent evidence. *Matern Child Nutr.* 2007;**3**(2):94–107. doi: 10.1111/j.1740-8709.2007.00088.x. [PubMed: 17355442].

7. Lilja G, Edhborg M, Nissen E. Depressive mood in women at childbirth predicts their mood and relationship with infant and partner during the first year postpartum. *Scand J Caring Sci.* 2012;**26**(2):245–53. doi: 10.1111/j.1471-6712.2011.00925.x. [PubMed: 21950600].

8. Hunker DF, Patrick TE, Albrecht SA, Wisner KL. Is difficult childbirth related to postpartum maternal outcomes in the early postpartum period?. *Arch Womens Ment Health.* 2009;**12**(4):211–9. doi: 10.1007/s00737-009-0068-3. [PubMed: 19350370].

9. Chaaya M, Campbell OM, El Kak F, Shaar D, Harb H, Kaddour A. Postpartum depression: prevalence and determinants in Lebanon. *Arch Womens Ment Health.* 2002;**5**(2):65–72. doi: 10.1007/s00737-002-0140-8. [PubMed: 12510201].

10. Logsdon MC, Cross R, Williams B, Simpson T. Prediction of postpartum social support and symptoms of depression in pregnant adolescents: a pilot study. *J Sch Nurs.* 2004;**20**(1):36–42. [PubMed: 14731107].

11. Dennis CL, Ross L. Women's perceptions of partner support and conflict in the development of postpartum depressive symptoms. *J Adv Nurs.* 2006;**56**(6):588–99. doi: 10.1111/j.1365-2648.2006.04059.x. [PubMed: 17118038].

12. Segre LS, O'Hara MW, Losch ME. Race/ethnicity and perinatal depressed mood. *J Reprod Infant Psychol.* 2006;**24**(02):99–106.

13. Xie RH, He G, Koszycki D, Walker M, Wen SW. Prenatal social support, postnatal social support, and postpartum depression. *Ann Epidemiol.* 2009;**19**(9):637–43. doi: 10.1016/j.annepidem.2009.03.008. [PubMed: 19443240].

14. Halbreich U. The association between pregnancy processes, preterm delivery, low birth weight, and postpartum depressions–the need for interdisciplinary integration. *Am J Obstet Gynecol.* 2005;**193**(4):1312–22. doi: 10.1016/j.ajog.2005.02.103. [PubMed: 16202720].

15. Boyce PM. Risk factors for postnatal depression: a review and risk factors in Australian populations. *Arch Womens Ment Health.* 2003;**6 Suppl 2**:S43–50. doi: 10.1007/s00737-003-0005-9. [PubMed: 14615922].

16. Azimi-Lolaty H, Danesh M, Hosaini S, Khalilian A, Zarghami M. Prevalence and Predictors of Postpartum Depression among Pregnant Women Referred to Mother-Child Health Care Clinics (MCH). *Res J Biolog Sci.* 2007;**3**(2):285–90.

17. Milgrom J, Gemmill AW, Bilszta JL, Hayes B, Barnett B, Brooks J, et al. Antenatal risk factors for postnatal depression: a large prospective study. *J Affect Disord.* 2008;**108**(1-2):147–57. doi: 10.1016/j.jad.2007.10.014. [PubMed: 18067974].

18. Kapp M. Mothers' perception of confidence with self-care and infant care. *J Perinat Edu.* 1998;**7**(4):17–25.

19. Leahy-Warren P, McCarthy G, Corcoran P. Postnatal depression in first-time mothers: prevalence and relationships between functional and structural social support at 6 and 12 weeks postpartum. *Arch Psychiatr Nurs.* 2011;**25**(3):174–84.

20. Leahy-Warren P, McCarthy G, Corcoran P. First-time mothers: social support, maternal parental self-efficacy and postnatal depression. *J Clin Nurs.* 2012;**21**(3-4):388–97. doi: 10.1111/j.1365-2702.2011.03701.x. [PubMed: 21435059].

21. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry.* 1987;**150**:782–6. [PubMed: 3651732].

22. Vaux A, Phillips J, Holly L, Thomson B, Williams D, Stewart D. The social support appraisals (SS-A) scale: Studies of reliability and validity. *Am J Commun Psychol.* 1986;**14**(2):195–218.

23. Vaux A. Factor structure of the network orientation scale. *Psychol Rep.* 1985;**57**(3f):1181–2.

24. Olson DH, Fournier DG, Druckman JM, McCubbin HI, Barnes H, Larsen A. ENRICH: Enriching and nurturing relationship issues, communication and happiness. St Paul, Minnesota: Family inventories Family social sciences, University of Minnesota; 1985.

25. Reece SM. The parent expectations survey: a measure of perceived self-efficacy. *Clin Nurs Res.* 1992;**1**(4):336–46. [PubMed: 1483137].

26. Rychnovsky JD, Brady MA. Choosing a postpartum depression screening instrument for your pediatric practice. *J Pediatr Health Care.* 2008;**22**(1):64–7. doi: 10.1016/j.pedhc.2007.09.007. [PubMed: 18174093].

27. Namazi S. Risk factors of postpartum depression, [in Persian]. *J Hormozgan Med.* 2000;**1**(3):17–24.

28. Fischer J, Corcoran K. Measures for clinical practice: A source book. 3 ed. 1. New York: Oxford University Press; 2007.

29. Fowers BJ, Olson DH. Enrich marital inventory: a discriminant validity and cross-validation assessment. *J Marital Fam Ther.* 1989;**15**(1):65–79. doi: 10.1111/j.1752-0606.1989.tb00777.x. [PubMed: 21118433].

30. Mahdavian F. Effect of educated relationship on marital satisfaction and mental health. Tehran: Psychological Institute; 1998.

31. Javaheri R. Effect of psycho-social factors on diabetes type-1, [in Persian; Unpublished dissertation for master of sciences]. Tehran: Institute of Psychology; 1989.

32. Tirgari A. Relationship between emotional intelligence and marital satisfaction. Tehran: Iran University of Medical Sciences; 2004.

33. Chaudron LH, Klein MH, Remington P, Palta M, Allen C, Essex MJ. Predictors, prodromes and incidence of postpartum depression. *J Psychosom Obstet Gynaecol.* 2001;**22**(2):103–12. [PubMed: 11446151].

34. Escriba-Aguir V, Artazcoz L. Gender differences in postpartum depression: a longitudinal cohort study. *J Epidemiol Community Health.* 2011;**65**(4):320–6. doi: 10.1136/jech.2008.085894. [PubMed: 20515899].

35. Gao LL, Chan SW, Mao Q. Depression, perceived stress, and social support among first-time Chinese mothers and fathers in the postpartum period. *Res Nurs Health.* 2009;**32**(1):50–8. doi: 10.1002/nur.20306. [PubMed: 18980171].

36. Evans J, Heron J, Francomb H, Oke S, Golding J. Cohort study of depressed mood during pregnancy and after childbirth. *BMJ.* 2001;**323**(7307):257–60. [PubMed: 11485953].

37. Heron J, O'Connor TG, Evans J, Golding J, Glover V, Alspac Study Team . The course of anxiety and depression through pregnancy and the postpartum in a community sample. *J Affect Disord.* 2004;**80**(1):65–73. doi: 10.1016/j.jad.2003.08.004. [PubMed: 15094259].

38. O'hara MW, Swain AM. Rates and risk of postpartum depression-a meta-analysis. *Int Rev Psychiatry.* 1996;**8**(1):37–54.

39. Logsdon MC, Birkimer JC, Simpson T, Looney S. Postpartum depression and social support in adolescents. *J Obstet Gynecol Neonatal Nurs.* 2005;**34**(1):46–54. doi: 10.1177/0884217504272802. [PubMed: 15673645].

40. Rahman A, Creed F. Outcome of prenatal depression and risk factors associated with persistence in the first postnatal year: prospective study from Rawalpindi, Pakistan. *J Affect Disord.* 2007;**100**(1-3):115–21. doi: 10.1016/j.jad.2006.10.004. [PubMed: 17098291].

41. Shaw E, Levitt C, Wong S, Kaczorowski J, McMaster University Postpartum Research G. Systematic review of the literature on postpartum care: effectiveness of postpartum support to improve maternal parenting, mental health, quality of life, and physical

health. *Birth.* 2006;**33**(3):210–20. doi: 10.1111/j.1523-536X.2006.00106.x. [PubMed: 16948721].

42. Nielsen Forman D, Videbech P, Hedegaard M, Dalby Salvig J, Secher NJ. Postpartum depression: identification of women at risk. *BJOG.* 2000;**107**(10):1210–7. [PubMed: 11028570].

43. Birkeland R, Thompson JK, Phares V. Adolescent motherhood and postpartum depression. *J Clin Child Adolesc Psychol.* 2005;**34**(2):292–300. doi: 10.1207/s15374424jccp3402_8. [PubMed: 15901229].

44. Grussu P, Quatraro RM. Prevalence and risk factors for a high level of postnatal depression symptomatology in Italian women: a sample drawn from ante-natal classes. *Eur Psychiatry.* 2009;**24**(5):327–33. doi: 10.1016/j.eurpsy.2009.01.006. [PubMed: 19328659].

45. Reid MK, Miles GT. Social Support, Stress, and Maternal Postpartum Depression: A Comparison of Supportive Relationships. *Social Sci Res.* 2013;**54**:246–62.

46. Martinez-Schallmoser L, Telleen S, MacMullen NJ. The effect of social support and acculturation on postpartum depression in Mexican American women. *J Transcult Nurs.* 2003;**14**(4):329–38. [PubMed: 14535154].

47. Kirpinar I, Gozum S, Pasinlioglu T. Prospective study of postpartum depression in eastern Turkey prevalence, socio-demographic and obstetric correlates, prenatal anxiety and early awareness. *J Clin Nurs.* 2010;**19**(3-4):422–31. doi: 10.1111/j.1365-2702.2009.03046.x. [PubMed: 20500282].

48. Nagy E, Molnar P, Pal A, Orvos H. Prevalence rates and socioeconomic characteristics of post-partum depression in Hungary. *Psy-* chiatry Res. 2011;**185**(1-2):113–20. doi: 10.1016/j.psychres.2010.05.005. [PubMed: 20965093].

49. Fisher JR, Morrow MM, Ngoc NT, Anh LT. Prevalence, nature, severity and correlates of postpartum depressive symptoms in Vietnam. *BJOG.* 2004;**111**(12):1353–60. [PubMed: 15663118].

50. Nahas V, Amasheh N. Culture care meanings and experiences of postpartum depression among Jordanian Australian women: a transcultural study. *J Transcult Nurs.* 1999;**10**(1):37–45. [PubMed: 10476151].

51. Logsdon MC, Usui W. Psychosocial predictors of postpartum depression in diverse groups of women. *West J Nurs Res.* 2001;**23**(6):563–74. [PubMed: 11569330].

52. 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. doi: 10.1016/j.genhosppsych.2004.02.006. [PubMed: 15234824].

53. Leung S, Arthur DG, Martinson I. Stress in women with postpartum depression: a phenomenological study. *J Adv Nurs.* 2005;**51**(4):353–60. doi: 10.1111/j.1365-2648.2005.03506.x. [PubMed: 16086804].

54. Gonidakis F, Rabavilas AD, Varsou E, Kreatsas G, Christodoulou GN. A 6-month study of postpartum depression and related factors in Athens Greece. *Compr Psychiatry.* 2008;**49**(3):275–82. doi: 10.1016/j.comppsych.2007.05.018. [PubMed: 18396187].

55. Mohammad KI, Gamble J, Creedy DK. Prevalence and factors associated with the development of antenatal and postnatal depression among Jordanian women. *Midwifery.* 2011;**27**(6):e238–45. doi: 10.1016/j.midw.2010.10.008. [PubMed: 21130548].