Original research

Postpartum depression and associated risk factors in Libya

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Abstract: Postpartum depression is a major maternal health problem after childbirth. It can start at any time within the first year after delivery and continue for several years. It is characterized by an inability to experience pleasure, anxiety symptoms, panic attacks, spontaneous crying and depressed mood. Some women with postpartum depression even have thoughts of harming their child and self-harm. The aim of this study is to find out the status of postpartum depression and the associated factors among postnatal mothers at first-, fourth- and sixth-month. This study is a prospective descriptive study, carried out in three major health facilities in Misurata. This study consists of three-part questionnaire. Part 1 covers demographic characteristics of the participants, while part 2 explores the associated risk factors according to the variables used. Part 3 constitutes for the psychological evaluation of the participants. Hundred mothers (age are between 15 and 43 years) were enrolled in this study. The findings revealed that prevalence of depression is 60% and 22% are suffering from borderline depression. Development of depression was strongly correlated with the sleeping disturbances, state of the neonate after birth, excess consumption of stimulants, less weight acceptance by mothers during pregnancy and infant illness. There was a weak relation between depression and delivery state, maternal admission to hospital during current pregnancy, and infant gender dissatisfaction. No correlation was found with development of depression regarding miscarriage, maternal medical problems after delivery, previous child sex, maternal age, education, parity or neonate weight. Thus, this study shows that a chance of having miscarriage and unhealthy neonate increases with advanced maternal age. It also shows that caesarean section is associated with bad neonatal outcomes, more weight gain and having gestational diabetes or preeclampsia during pregnancy. Maternal sleeping problems are more pronounced in the first month, attributing for the baby care, compared with fourth and sixth months. The study indicates that depression is a common state of psychiatric disorders among Libyan women and should have an appropriate attention by physicians and gynecologists.

Introduction

Pregnancy is a physiological condition that is life altering experience and can be different for every woman. The pregnancy period lasts for about 40 weeks and the woman experiences many emotional, physical, mental and spiritual changes during this period [1]. However, after childbirth, a mother can experience varied emotions ranging from joy and pleasure to sadness and crying bouts. Most new mothers have these feelings in a mild form called baby blues which often subside in a few hours or a week. However, some women can develop postpartum depression (PPD). Globally, PPD is a significant health issue that can impact the health of the mother, her marital relationship, interaction with the newborn as well as infant growth [2]. The first symptom of PPD, usually appears within four weeks of delivery, which can range from mild to severe [3]. Women with PPD can suffer from some common symptoms such as sleep disorder, irritability, inability to experience pleasure, anxiety symptoms, panic attacks, spontaneous crying and depressed mood [4 - 6]. Some women with PPD even have thoughts of harming their child and self-harm [5, 6]. However depression is treatable, untreated postpartum depression or non-diagnosis of PPD can have a prolonged adverse effects on the mother and her children [7]. Worldwide, the prevalence of PPD wide-ranges from 05% to 60% [8]. Prevalence of PPD is high in developing countries where psychological issues are mostly ignored [9].

Numerous studies have demonstrated many factors associated with PPD including obstetric history, mode of delivery [10] and biochemical genetic [11, 12] as well as social stressors such as age [13], socio-economy [14, 15], culture [16], education and negative life events. To prevent or minimize PPD, an early treatment of PPD is likely to reduce public sector costs, increase earnings and improve quality of life for women [17]. Thus, determining the prevalence rate of postpartum depression and identifying associated risk factors with, it is an important issue to illustrate the magnitude of the problem. With regard to the postnatal depression, to the best of our knowledge, no previous studies have been reported to indicating a prevalence of the

mental status of the mother after delivery in Libya. The main aim of this study is to find out status of postnatal depression and risk factors associated among the postnatal mothers attending different health facilities at first-, fourth- and sixth-month post-delivery in Libya.

Materials and methods

This is a prospective descriptive study conducted in three health facilities in Misurata, a large city located at east of Tripoli by 200 Km, Libya. The major health facilities included in the study were: Misurata Central Hospital, Algoshi Health Center, Algheran Health Center. The study conducted for a period of two months included 100 mothers (age 15 - 43 years). Mothers at first; fourth and sixth months after delivery were enrolled. Mothers who gave birth less than one month and more than six months were excluded from this study. Data were gathered using a three-part validated questionnaire by a direct self-interview with the women at the health facilities by the main investigators. Part I covers questions on the subject's demographic characteristics including mother age, educational level, baby`s age, baby gender, previous child`s sex, delivery state and parity. Part II contains questions exploring risk factors according to the variables used such as obstetric-related variables, delivery and pregnancy-related complications as neonate state after delivery, the infant health, neonate weight, breast-feeding pattern, maternal weight acceptance during current pregnancy, mother`s history of admission to hospital during current pregnancy, history of miscarriage, presence of diseases after delivery, sleeping disturbance and consumption of stimulants during and after delivery. Part III of the questionnaire constituted for psychological evaluation. The depression module of the questionnaire that is used in this study is constituted 10 depression criteria using Edinburg postnatal Depression Scale [18]. The maximum score: 22. Women were considered to suffer from depression if they score 11 or more. A score of 6 - 10 was considered as borderline (mild) depression. While a score less than six were considered as not depressed woman. Both descriptive and comparative statistics were used.

Analysis of the data by using following: frequency distribution, percentage, standard deviation and Spearman correlation test were used. A *$p < 0.05$ was considered to be a statistical significance different.

Results

In **Table 1**, out of the 100 participants, 18% were found to be not depressed (score < 6), 22.0% of the participants had a borderline depression (score 6 - 10) while 51.0% had depression (score ≥ 11) and those who had severe depression (score ≥ 18) composite of 09% in the study sample. Hence, the prevalence rate of PPD was found to be 60.0%. Regarding the severe depression, this class was among women in the age group of 20 - 35 years. Depression was further classified according to the period spent with the depressed mood, as reactive, for mothers who were depressed at first month after delivery, moderate, for those at fourth month and chronic for those at sixth month after delivery. The present results show that only one participant (04.5%) at first month was not depressed, six participants had borderline depression (27.2%) while nine of participants had reactive depression (40.9%) and six women suffered from severe reactive depression (27.2%). Six participants at four months after delivery were not depressed (15.7%), ten participants had borderline depression (26.3%) and 22 participants had depression (moderate) (57.8%), however, none of the women at this group suffered from severe depression. Regarding the participants at sixth month after delivery, 11 participants were not depressed (27.5%), six had borderline depression (15.0%), 20 participants had chronic depression (50.0%), while only three participants suffered from severe chronic depression (07.5%).

Table 1: Occurrence of postpartum depression among Libyan postnatal mothers

Study variables	Number and percentage (n = 100)			
Degree of depression				
No depression	18.0%			
Borderline depression	22.0%			
Depression	51.0%			
Severe depression	09.0%			
Degree of depression according to the period spent with depressed mood n (%)				
Period	Not depressed (< 6)	Borderline depression (6 - 10)	Depression (≥ 11)	Severe depression (≥ 18)	**Total**
1 month	01 (04.5)	06 (27.2)	09 (40.9)	06 (27.2)	**22**
4 months	06 (15.7)	10 (26.3)	22 (57.8)	00 (00.0)	**38**
6 months	11 (27.5)	06 (15.0)	20 (50.0)	03 (07.5)	**40**
Total	**18**	**22**	**51**	**09**	**100**

Data as shown in **Table 2**, regarding the maternal age and its relationship with the development of depression indicating that four participants (36.3%) under the age of twenty had depression while 46 of participants in age group between 20 - 35 years had depression (60.6%). In the age group over 35 years, 10 participants had depression (77%, **Figure 1**). However, the Spearman correlation test was found to be very weak - 0.091 with $p = 0.369$, the development of depression is not related to advanced maternal age. Concerning educational level of the participants, 20 participants had depression (51.2%) had basic education, 20 of participants with high school education had depression (69.0%) and in participants with college education, 20 had depression (62.5%). The correlation was 0.072 with $p = 0.479$, the mother educational level was irrelevant to development of depression (**Figure 2**). The findings also show that 28 of participants who had female baby developed depression (66.7%), however, among women who had male baby, 32 participants had depression (55.2%) as it is shown in **Figure 3**. A Spearman correlation test for the female gender and development of depression revealed a very weak 0.116 with $p = 0.251$. Women who had female baby

had a slight chance to develop depression while the correlation for the male gender was also weak - 0.116 and p = 0.251. The development of depression was inversely correlated with the male gender; mother who had male baby were less likely to develop depression.

With regard to the previous child sex, having baby with the same sex as the previous child was irrelevant to the development of depression. Among 26 participants who had baby not having the same sex with the previous child, 20 developed depression (76.9%) while among 46 participants who had baby with the same sex as the previous child, 28 had developed depression (60.8%). The correlation was - 0.215 and p = 0.032. However, most of the study population were primiparious (have one child), followed by two children, three, or more than four, and the last are those having four children. Parity was investigate its relation to depression which was irrelevant (r = 0.021, p = 0.838).

The current study also shows that delivery by caesarean seems to be associated with the risk of developing depression, 20 participants delivered by caesarean section developed depression (71.4%) compared with the normal delivery 40 participants developed depression (55.6%) as shown in **Figure 4**. However this relationship was weak with regarding correlation (0.145, p = 0.149). In this study, it is found that admission of the neonate to NCU had a marked effect on the development of depression among the mothers, 22 of the participants who had their babies admitted to NCU developed depression (88.0%) while this number decreased to 38 among mothers who had normal healthy baby (50.7%) as shown in **Figure 5**. It is statistically significant, r = 0.354, p = 0.00, mothers who had unhealthy neonates were more likely to develop depression. There is also no relation between the development of depression and low body weight, only 16 of the participants who had neonate with low body weight developed depression (57.1%), while 34 of mothers who had neonates with normal body weight developed depression (61.8%) and 10 of mother who had neonates with body weight more than the normal range (> 4 Kg) also developed depression (58.8%) with correlation of 0.036, p = 0.719. Having a

neonate with low body weight does not affect the chance of developing depression at all. Also, there is a relation between infant illness and development of depression among their mothers, 34 participants who their babies got till developed depression (72.3%) while 26 of the participants who their babies did not get an illness developed depression (49.1%) as presented in **Figure 6**, this is statistically significant (r = 0.266, p = 0.007).

The finding shows that there is a relationship between the less acceptance of weight while being pregnant and the development of depression; those mothers were at a high risk of developing depression after delivery; among them 34 developed depression (72.3%) while in the group of women who accepted their weight, 26 developed depression after delivery (49.1%, **Figure 7**). This is statistically significant (r = 0.236, p = 0.018). Moreover, the results seem to have a relationship between the history of miscarriage and developing depression. Thus, 27 of the participants who had a previous history of miscarriage developed depression after current pregnancy (61.3%), while in the group of participants who did not had previous history of miscarriage, 33 developed depression (59.0%). However, the correlation was very weak (r = 0.040, p = 0.691). Also, it is found that admission to hospital during current pregnancy is associated with the development of depression after delivery, 29 of the participants who admitted to hospital developed depression (69.0%) while among the participants who did not admitted to hospital; 31 developed depression after delivery (53.5%), however, this relationship was weak with Spearman correlation test (r = 0.157, p = 0.118). Present data revealed that having a disease among women after delivery was associated with higher chance of developing depression, 21 participants who had disease after delivery (61.8%) developed depression while 39 of the participants who did not have disease after delivery developed depression (59.1%). However, this relationship was very weak (r = 0.026, p = 0.798). It also shows that sleeping pattern changes after delivery is associated with higher risk of developing depression with 54 of participants who had sleeping disturbance (initial insomnia, middle insomnia, terminal insomnia) developed depression (73.0%), on the other hand,

six women who had normal sleeping habit developed depression (23.1%, **Figure 8**). This is statistically significant with correlation of 0.432 and $p = 0.00$ indicating women who had sleeping disturbance were more likely to develop depression.

Table 2: Demographic characteristics and factors associated with postpartum depression

Characteristics	Total n (%)	Postpartum depression n (%)	r	p
Maternal age in years			*- 0.091*	*0.369*
< 20	11 (11)	04 (36.3)		
20 - 35	76 (76)	46 (60.6)		
> 35	13 (13)	10 (77.0)		
Education level			*0.072*	*0.479*
Basic education	39 (39)	20 (51.2)		
High school	29 (29)	20 (69.0)		
College	32 (32)	20 (62.5)		
Baby gender				
Female	42 (42)	28 (66.7)	0.116	0.251
Male	58 (58)	32 (55.2)	- 0.116	0.251
Previous child sex			*- 0.215*	*0.032*
Same sex	46 (46)	28 (60.8)		
Not same sex	26 (26)	20 (76.9)		
Parity (No. of children)			*0.021*	*0.838*
Delivery state			*0.145*	*0.149*
Normal	72 (72)	40 (55.6)		
Caesarian	28 (28)	20 (71.4)		
State of the neonate after delivery			*0.354**	*0.00**
Admitted to NICU	25 (25)	22 (88.0)		
Normal healthy baby	75 (75)	38 (50.7)		
Neonate weight			*0.036*	*0.719*
Low body weight (< 3.0 Kg)	28 (28)	16 (57.1)		
Normal body weight (3 - 4 Kg)	55 (55)	34 (61.8)		
High body weight (> 4 Kg)	17 (17)	10 (58.8)		
Infant health (Presence of disease after delivery)			*0.266**	*0.007**
Bad health	47 (47)	34 (72.3)		
Good health	53 (53)	26 (49.1)		
Maternal weight acceptance during current pregnancy			*0.236**	*0.018**
Women who accepted their weight	53 (53)	26 (49.1)		
Women who did not acceptance their weight	47 (47)	34 (72.3)		
History of miscarriage			*0.040*	*0.691*
Previous history of miscarriage	44 (44)	27 (61.3)		
No history of miscarriage	56 (56)	33 (59.0)		
History of admission to hospital during current pregnancy			*0.157*	*0.118*
Admitted	43 (43)	29 (69.0)		
Not admitted	57 (57)	31 (53.5)		
Presence of disease after delivery			*0.026*	*0.798*
Women who had disease	34 (34)	21 (61.8)		
Women who not had disease	66 (66)	39 (59.1)		
Sleeping disturbance			*0.432**	*0.00**
Sleeping disturbance	74 (74)	54 (73.0)		
Normal Sleeping habit	26 (26)	06 (23.1)		
Stimulants consumption after delivery			*0.369**	*0.00**
Higher stimulants intake	74 (74)	50 (67)		
Women who did not consume any stimulants	26 (26)	10 (38.4)		

*Significant different by p < 0.05

Also, the higher stimulants intake after delivery is associated with depression, 50 participants who consumed stimulant drinks such as tea, coffee or both after delivery had depression (67.5%) while 10 women who did not consume any stimulant drinks after delivery developed depression (38.4%, **Figure 9**). This is statistically significant with a correlation of 0.369, $p = 0.01$.
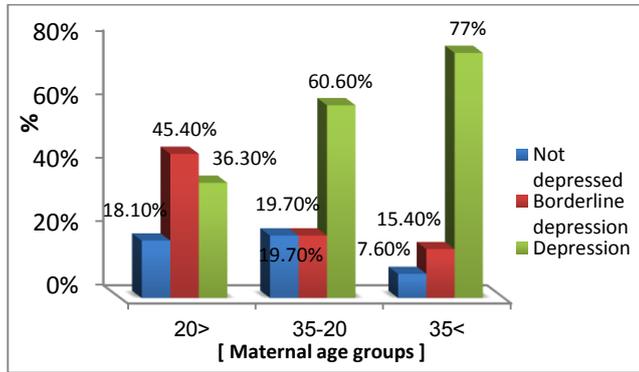
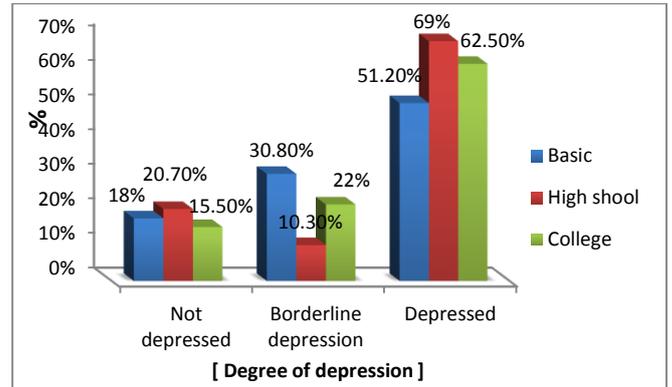**Figure 1:** Degree of postpartum depression and maternal age in Libya

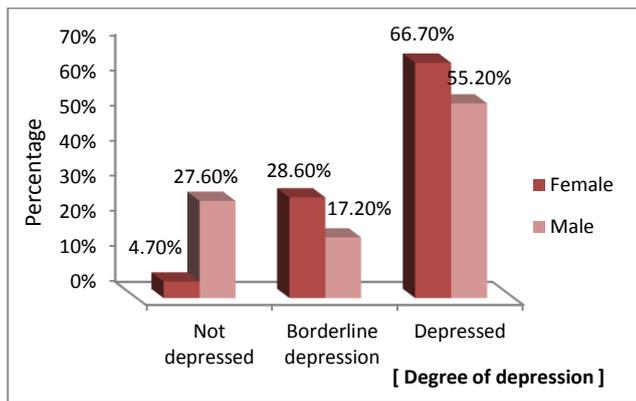**Figure 2:** Educational level and degree of postpartum depression

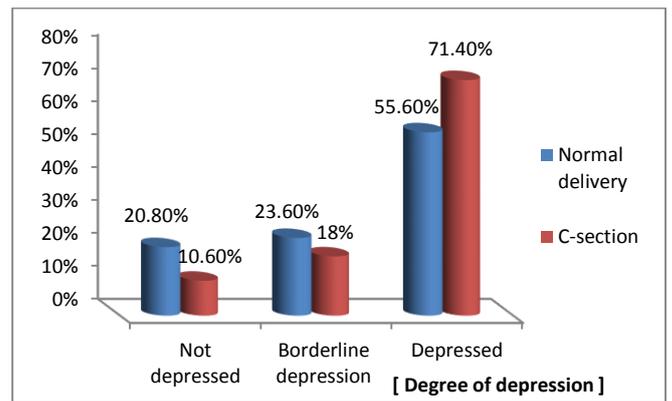**Figure 3:** Baby gender and degree of postpartum depression

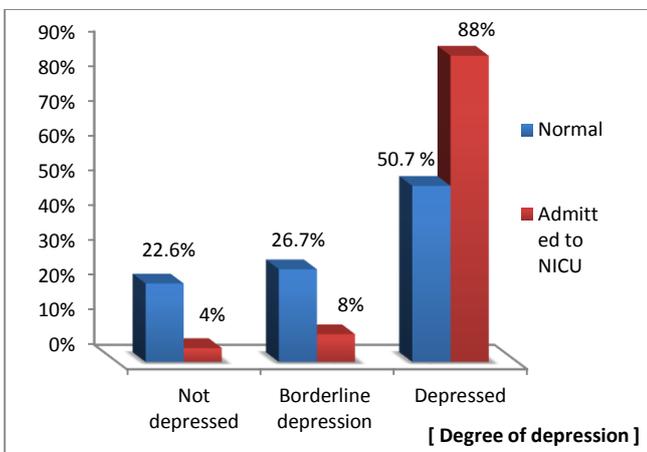**Figure 4:** Delivery state and the degree of postpartum depression

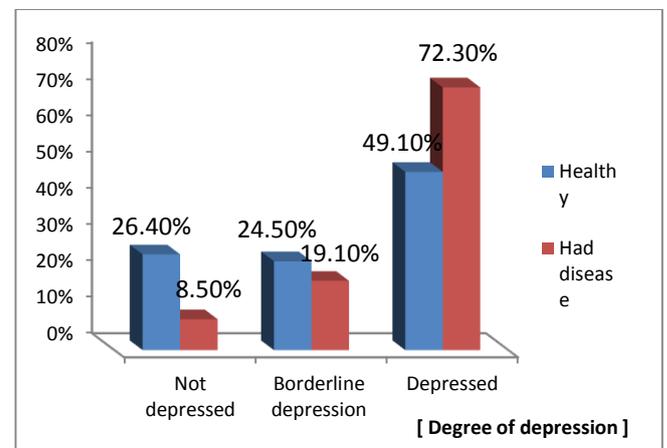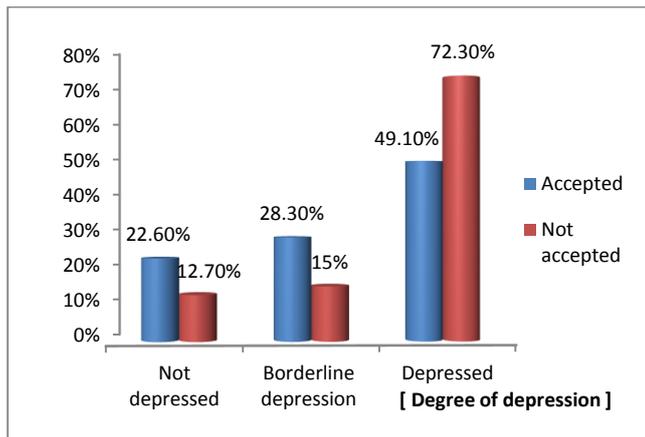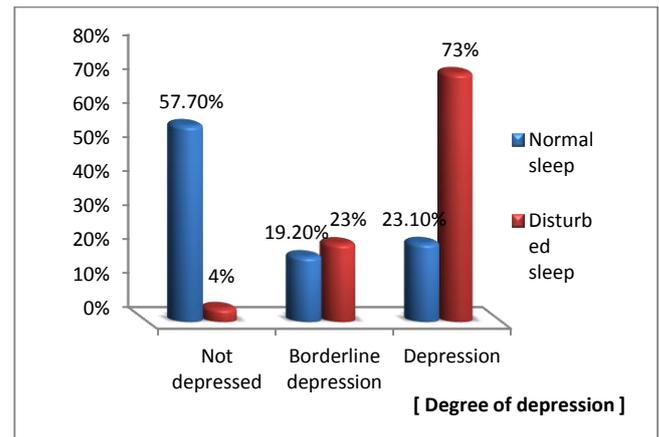**Figure 5:** State of the neonate after delivery and degree of postpartum depression
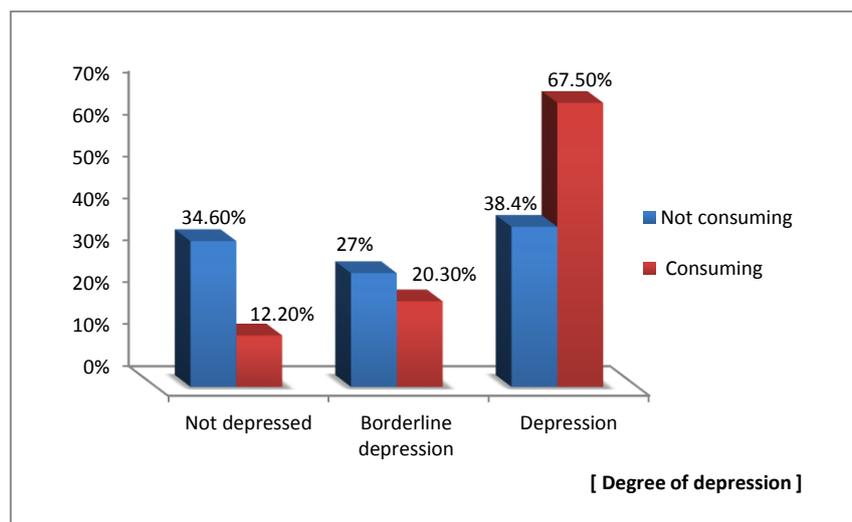

Figure 6: Infant health and degree of postpartum depression

Figure 7: Maternal weight acceptance during pregnancy
and degree of postpartum depression

Figure 8: Sleeping patterns and degree of depression

Figure 9: Consumption of stimulant drinks and degree of postpartum depression

Discussion

The postpartum period is recognized as a high-risk period for the development of various mood disorders like postpartum depression. Globally, postnatal depression is a serious public health problem that has negative impact on the mother's health and child development, especially in developing countries. The finding of this study revealed that about 20% of the participants were not depressed (score < 6), 20% had borderline depression (score: 6 - 10) and about 60% were to

depressed person (score $\geq$ 11). Al-Maghur and others [19] reported that 42% of the participants had depression in a study carried out in Tripoli. A meta-analysis study of PPD in India, Turkey and countries in the Middle East found a comparable pooled prevalence of postpartum depression which is 22%, 24% and 27%, respectively [20 - 22]. The prevalence rate was higher in our study compared with studies carried out in Canada, Denmark, Uganda (Kampala) and Egypt which reported to be

01.6%, 05.5%, 0 6.1% and 07.1%, respectively [23 - 26]. Prevalence of depression was significantly high in our group, this rate of prevalence may have several reasons. Obstetric clinicians ignore both depression and other psychiatric disorders during pregnancy. On the other hand, women often are hesitant to ask for help because of the shame (shy), cultural expectation or misbelieve that their feelings are normal reaction to this new condition. The high rate might also be due to the use of different measurement tools, study design and sample size. The present study showed a strong relationship between the state of the neonate after delivery and the development of depression, 88% of the mothers who had their babies admitted to NICU developed depression. These results are in line with Gawass and co-workers [19] reported that 58% of women whose neonates admitted to NICU developed depression. Also, the development of depression was strongly associated with sleeping disturbances after delivery, about 75% of women who had sleeping disturbance developed depression, this percentage is very high compared to other studies and the majority of the depressed women reported having trouble falling asleep at night, attributing the baby as the cause of the sleep problems. In a study carried out in Nepal investigating sleep and its relation to depression in women after delivery, the prevalence of depression among women with sleeping disturbance was found to be 16.5%. A similar study in Norway reported that depression is associated with poor sleeping after delivery with a prevalence of 58% [27]. Other studies were also show that there is relationship between less sleep and PPD [28, 29]. Another variable that is not reported in other studies is the excessive stimulants consumption after delivery (coffee, tea) was associated with depression in this study (prevalence = 67.5%), the reason may be that women who consume more coffee or tea would be more susceptible to have poor sleeping, which is may correlated to depression. In the present study, regarding the infant illness, about 70% of the participants who their babies had an illness after birth developed depression. Infant with Illness needs more caring, hospitalization and sometimes separation from mother. Self-accusation by mother or negative

comments from others about infant illness especially congenital anomalies induces guilt feeling or depression. Tashakori and others [30] reported that infant illness predisposes to the development of depression in Iran. Infant gender dissatisfaction had strong relation with depression, in the Iranian study reported that, the preference for male child and negative reactions of family members to female child may cause or exacerbate depression. Similar findings have been documented from the developing countries Nigeria, India, Turkey and China where they reported female gender of the newborn as risk factor for depression where boy is preferred in these cultures [27, 30].

In this study, weak relation between delivery by caesarean-section and depression exists, similar results regarding caesarean-section and its relation to depression [19]. However, the delivery state and its relation to the development of depression has contradictory findings, in study conducted in Lebanon that normal delivery is significantly associated with depression and that caesarean - section decreased the risk of depression [31]. Tashakori and others have reported that delivery state is irrelevant to development of depression [30]. Furthermore, in the current study, hospital admission during pregnancy was weakly correlated to depression after delivery. This results were consistent with finding of previous study conducted in [30]. Pregnancy is often accompanied by positive behavioral and attitudinal changes with regard to eating and weight but it seems that underlying concerns about eating and weight persist and may reemerge as pregnancy progresses. The postpartum period is a vulnerable time for weight concerns. In the early postpartum period, a majority of women are carrying more weight than they did before pregnancy and, in contrast to pregnancy, may no longer attribute the weight gain to positive aspects of providing for developing infant [32]. In this study, the less weight acceptance by mothers seems to be positively associated with depression after pregnancy, about half of the mothers who did not accept their weight during pregnancy tried to lose weight in early postpartum. Moreover, about 75% of the mothers who did not accept their weight developed depression. Though,

no studies suggest the relation between maternal weight acceptance during pregnancy and the development of depression after delivery. Available studies are relating the maternal weight with depression during pregnancy or the weight concerns in the early postpartum and its relation to depression [32]. The present study also reveals no relation between educational level and maternal age. However, several studies reported that lower education is associated with depression. A low educational level prevents access to most professional jobs and increases vulnerability to psychiatric disorders. In addition, women with higher educational level may have high self-esteem, high intellectual function and better coping strategies [30, 33]. On the other hand, women with higher education and at young age were more likely to develop depression [19]. Several studies suggest no relation exist between educational level and age with the development of psychiatric disorders [27, 34]. This finding is in consistent with the present findings. In a previous study by Silva and others [35], the highest level of depression has been reported in mothers aged 13 - 19 years while the lowest rate has been seen in women with the age

range of 31 - 35 years old. Also, our study identifies no significant association between parity and occurrence of postpartum depression while parity was associated with PPD [36]. The current finding showed no relation between previous child sex, miscarriage experience and presence of medical problem after delivery and neonatal weight with the development of depression among enrolled mothers. In a previous published study, mothers with higher parity are less likely to develop depression and the miscarriage experience was associated with depression [19, 27]. Despite several risk factors studied in this study, other factors were not reported like lower socioeconomic status, stressful life events during pregnancy or early postpartum, lack of social support from women relatives, relationship problems with the husband [37, 38].

Conclusion: This study reports that postpartum depression is a common state of psychiatric disorders among women in Libya. This issue should have an appropriate attention by physicians, gynecologists and other health care providers.

References

1. Zaheri F, Nasab LH, Ranaei F, Shahoei R (2017) The relationship between quality of life after childbirth and the childbirth method in nulliparous women referred to healthcare centers in Sanandaj, Iran. Electron Physician. 9 (12): 5985-5990. doi: 10.19082/5985.
2. Arifin SR, Ahmad A, Abdul Rahman R, Loh HS, Ng CG (2014) Postpartum depression in Malaysian women: the association with the timing of pregnancy and sense of personal control during childbirth. International Journal of Academic Research. 6 (3): 143-149. doi: 10.7813/2075-4124.2014/6-3/B.21.

3. Teissedre F, Chabrol H (2004) A study of the Edinburgh postnatal depression scale (EPDS) on 859 mothers: detection of mothers at risk for postpartum depression. Encephale. 30 (4): 376-381. doi: 10.1016/s0013-7006(04)95451-6.

4. American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders (DSM-5-TR). 5th Ed. Washington, DC.

5. Stewart DE, Vigod S (2016) Postpartum depression. The New England Journal of Medicine. 375 (22): 2177-2186. doi: 10.1056/NEJMcp1607649.

6. Radzi, WM, Jenatabadi HS, Samsudin N (2021) Postpartum depression symptoms in survey-based research: A structural equation analysis. BioMed Central (BMC) Public Health. 21: 27. 1-12. doi.org/10.1186/s12889-020-09999-2.

7. Liu S, Yan Y, Gao X, Xiang S, Sha T, Zeng G, He Q (2017) Risk factors for postpartum depression among Chinese women: path model analysis, BMC Pregnancy and Childbirth. 17 (1): 133. doi: 10.1186/s12884-017-1320-x.

8. Klainin P, Arthur DG (2009) Postpartum depression in Asian cultures: A literature review. International Journal of Nursing Studies. 46 (10): 1355-1373. doi: 10.1016/j.ijnurstu.2009.02.012.

9. Halbreich U, Karkun S (2006) Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. Journal of Affective Disorders. 91 (2-3): 97-111. doi: 10.1016/j.jad.2005.12.051.

10. Zanardo V, Giliberti L, Volpe F, Parotto M, de Luca F, Straface G (2017) Cohort study of the depression, anxiety, and anhedonia components of the Edinburgh Postnatal Depression Scale after delivery. International Journal of Gynecology and Obstetrics. 137 (3): 277-281. doi: 10.1002/ijgo.12138.

11. Yim IS, Tanner Stapleton LR, Guardino CM, Hahn-Holbrook J, Dunkel Schetter C (2015) Biological and psychosocial predictors of postpartum depression: systematic review and call for integration. Annual Review of Clinical Psychology. 11: 99-137. doi: 10.1146/annurev-clinpsy-101414-020426.

12. Fiala A, Svancara J, Klanova J, Kasparek T (2017) Sociodemographic and delivery risk factors for developing postpartum depression in a sample of 3233 mothers from the Czech ELSPAC study," BMC Psychiatry. 17 (1): 104. doi: 10.1186/s12888-017-1261-y.

13. Alharbi AA, Abdulghani HM (2014) Risk factors associated with postpartum depression in the Saudi population. Neuropsychiatric Disease and Treatment.10: 311-316. doi: 10.2147/NDT.S57556.

14. Toy S, Tripodis Y, Yang K, Cook J, Garg A (2016) Influence of maternal depression on wic participation in low-income families. Maternal and Child Health Journal. 20 (3): 710-719. doi: 10.1007/s10995-015-1871-2.

15. Sampson M, Villarreal Y, Rubin A (2014) A problem-solving therapy intervention for low-income, pregnant women at risk for postpartum depression. Research on Social Work Practice. 26 (3): 236-242. doi.org/10.1177/1049731514551143.

16. Deng AW, Xiong RB, Jiang TT, Luo YP, Chen WZ (2014) Prevalence and risk factors of postpartum depression in a population-based sample of women in Tangxia Community, Guangzhou. Asian Pacific Journal of Tropical Medicine. 7 (3): 244-249. doi: 10.1016/S1995-7645(14)60030-4.

17. Bauer A, Pawlby S, Plant DT, King D, Pariante CM, Knapp M (2015) Perinatal depression and child development: Exploring the economic consequences from a South London cohort. Psychological Medicine. 45 (1): 51-61. doi: 10.1017/S0033291714001044.

18. Cox JL, Holden JM, Sagovsky R (1987) Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. The British Journal of Psychiatry. 1987 150: 782-786. doi: 10.1192/bjp.150.6.782.

19. Gawass M, Al-Maghur L, Gantri R, Ragab HB (2009) Risk factors for postnatal depression in Libyan women. Jamahiriya Medical Journal. 9 (1) 41-45.

20. Alshikh Ahmad H, Alkhatib A, Luo J (2021) Prevalence and risk factors of postpartum depression in the Middle East: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 21 (1): 542. doi: 10.1186/s12884-021-04016-9.

21. Upadhyay RP, Chowdhury R, Salehi A, Sarkar K, Singh SK, Sinha B, Pawar A, Rajalakshmi AK, Kumar A (2017) Postpartum depression in India: a systematic review and meta-analysis. Bulletin of the World Health Organization. 95 (10): 706-717. doi: 10.2471/BLT.17.192237.

22. Özcan NK, Boyacıoğlu NE, Dinç H (2017) Postpartum depression prevalence and risk factors in Turkey: a systematic review and meta-analysis. Archives of Psychiatric Nursing. 31 (4): 420-428. doi: 10.1016/j.apnu.2017.04.006.

23. Eberhard-Gran M, Eskild A, Tambs K, Samuelsen S, Opjordsmoen S (2002) Depression in postpartum and non-postpartum women: prevalence and risk factors. Acta Psychiatrica Scandinavica. 106 (6): 426-433. doi: 10.1034/j.1600-0447.2002.02408.x.

24. Nielsen D, Videbech P, Hedegaard M, Dalby J, Secher NJ (2000) Postpartum depression: identification of women at risk. British Journal of Obstetrics and Gynecology. 107 (10): 1210-1217. doi: 10.1111/j.1471-0528.2000.tb11609.x.

25. Nakku JN, Nakasi G, Mirembe F (2006) Postpartum major depression at six weeks in primary health care: prevalence and associated factors. African Health Sci. 6 (4): 207-214. PMID: 17604509.

26. Salem MN, Thabet MN, Fouly H, Abbas AM (2017) Factors affecting the occurrence of postpartum depression among puerperal women in Sohag city, Egypt. Proceeding in Obstetrics Gynecology. 7 (1): 1-10. doi.org/10.17077/2154-4751.1328.

27. Dørheim SK (2009) Depression and sleep in the postnatal period: a study in Nepal and Norway, section for general practice, Department of Public Health and Primary Health Care, University of Bergen, Norway. https://hdl.handle.net/1956/3845.

28. Helle N, Barkmann C, Bartz-Seel J, Diehl T, Ehrhardt S, Hendel A, Nestoriuc Y, Schulti-Markwort M, von der Wanse A, Bindt C (2015) Very low birth-weight as a risk factor for postpartum depression four to six weeks postbirth in mothers and fathers: Cross-sectional results from a controlled multicentre cohort study. Journal of Affective Disorders. 180: 154-161. doi: 10.1016/j.jad.2015.04.001.

29. Houston KA, Kaimal AJ, Nakagawa S, Gregorich SE, Yee LM, Kuppermann M (2015) Mode of delivery and postpartum depression: The role of patient preferences. American Journal of Obstetrics and Gynecology. 212 (2): 229.e1-7. doi: 10.1016/j.ajog.2014.09.002.

30. Tashakori A, Shanesaz A, Rezapour A (2009) Assessment of some potential risk factors of postpartum depression. Pakistan Journal of Medical Sciences. 25 (2): 261-264.

31. Chaaya M, Campbell OMR, El Kak F, Shaar D, Harb H, Kaddour A (2002) Postpartum depression: prevalence and determinants in Lebanon. Archives of Women's Mental Health. 5 (2): 65-72. doi: 10.1007/s00737-002-0140-8.

32. Carter A, Wood Baker C, Brownell D (2000) Body mass index, eating attitudes, and symptoms of depression and anxiety in pregnancy and the postpartum period. Psychosomatic Medicine. 62 (2): 264-270. doi: 10.1097/00006842-200003000-00019.

33. Investing in Mental Health (2003) Department of Mental Health and Substance Dependence, Non-communicable Diseases and Mental Health. World Health Organization, Geneva, Switzerland. ISBN: 9241562579.

34. Chalise M, Karmacharya I, Kaphle M, Wagle A, Chand N, Adhikari L (2020) Factors associated with postnatal depression among mothers attending at Bharatpur Hospital, Chitwan. Depression Research and Treatment. Article ID 9127672. 7. doi.org/10.1155/2020/9127672.

35. Silva R, Jansen K, Souza L, Quevedo L, Barbosa L, Moraes I, Horta B, Pinheiro R (2012) Sociodemographic risk factors of perinatal depression: A cohort study in the public health care system. Revista Brasileira de Psiquiatria. 34 (2): 143-148. doi: 10.1590/s1516-44462012000200005.

36. Ho-Yen SD, Bondevik GT, Eberhard-Gran M, Bjorvatn B (2007) Factors associated with depressive symptoms among postnatal women in Nepal. Acta Obstetricia et Gynecologica Scandinavica. 86 (3): 291-297. doi: 10.1080/00016340601110812.

37. Dindar I, Erdogan S (2007) Screening of Turkish women for postpartum depression within the first postpartum year: the risk profile of a community sample. Public Health Nursing. 24 (2): 176-183. doi: 10.1111/j.1525-1446.2007.00622.x.

38. Klainin P, Arthur DG (2009) Postpartum depression in Asian cultures: a literature review. International Journal of Nursing Studies. 46 (10): 1355-1373. doi: 10.1016/j.ijnurstu.2009.02.012.